

# An Assessment of the State of Misinformation Regarding Eye Diseases and their Treatment in the General Public

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## ABSTRACT

**Background:** The importance of eye health in the overall well-being of an individual continues to be a neglected topic. As a result, potentially harmful knowledge gaps prevail. Myths and misconceptions continue to spread in low and middle-income regions such as Karachi.

**Objective:** To identify perceptions of eye diseases and their treatment in a local subset of the population as well as the extent of their knowledge of ophthalmological conditions based on their education level.

**Methodology:** This is a cross-sectional study conducted in the Out-Patient Department of Ophthalmology (OPD) of Dow International Medical College (DIMC), Karachi, from January 2021 until August 2021. Informed consent was signed, and each subject was interviewed using a questionnaire regarding their understanding of eye diseases. The data collected was then entered into the pro forma which was analyzed using SPSS version 23.

**Results:** A total of 390 subjects were selected from the OPD. Their age ranged from 18 to 79 years with a mean age of  $36.4 \pm 14.2$  years. The participants of the study consisted of 182 (46.7%) males and 208 (53.3%) females. However, There was a general perspective that cataract is a condition that can be corrected by using eye drops (18.7%) and that fennel, almonds, and rock candy are beneficial for the eyes (63.3%). Among people of all educational standards, the highly educated significantly demonstrated correct knowledge regarding whether the use of Surma and kajal ( $p=0.030$ ), and Arq-e-Gulab ( $p=0.002$ ) are beneficial and the need for a soft diet after cataract surgery ( $p=0.030$ ).

**Conclusion:** Despite the cultural beliefs we observed, people generally exhibited a relatively reasonable level of knowledge in terms of safe eye care practice.

**Keywords:** Myths, eye, lead sulfide (Surma), candy (Misri), *Prunus dulcis* (Badam), rose-water.

## INTRODUCTION

The eye is a delicate, yet complex organ that plays a vital role in our growth, development, and performance. Despite the importance of eye health in a person's overall well-being, knowledge gaps have been filled with potentially harmful myths and misconceptions that continue to spread in low and middle-income regions such as Karachi. Socioeconomic disparities in Karachi include inadequate education, low level of income, poor access to health care, and high illiteracy rates which contribute to fallacies about ocular wellness [1].

The prevalence of blindness is three to four times higher in developing countries *versus* industrialized nations [2]. Statistics in 2003 showed approximately 1.14 million adults were affected by ocular pathologies in Pakistan [3]. Countries with low urbanization rates such as Pakistan tend to have lower educational attainment which inversely correlates with disease prevalence. This is evidenced by a study that took place in 2007, determining that cataract was the most common cause

of blindness in Pakistan with a prevalence rate of 51.5% [4], while the prevalence rate of cataract in the U.S. population over age 40 is 17% [5]. Further studies asserted that individuals with higher education levels tend to have better health status than a person with lower levels of education [6].

Common pathologies such as refractive errors, cataracts, and glaucoma are often self-treated by patients utilizing unconventional practices that may not have adequate clinical efficacy. The myths and misconceptions driving these practices are often based on culturally-driven beliefs, some of which have no scientific justification and rarely bring benefit to eye health [7]. Applying "kajal" (kohl), locally known as Surma, is an old tradition that residents of South Asian countries such as Pakistan commonly practice because of inaccurate or falsely perceived ocular health benefits. Commercially produced kajal is an eye preparation consisting of galena (PbS), minium (Pb<sub>3</sub>O<sub>4</sub>), amorphous carbon, magnetite (Fe<sub>3</sub>O<sub>4</sub>), and zincite (ZnO) [8]. "Arq-e-Gulab" (rose water drops), "Saunf" (fennel seeds), "badam" (almonds), and "misri" (rock sugar) are other common folk remedies that are used for several eye conditions.

Due to a lack of awareness, compromised quality of life, and misleading insight about eye health, conditions

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that are easily treatable can progress to severe ocular disease, often leading to blindness [9, 10]. Therefore, this research aims to identify current misperceptions about eye diseases and treatments, as well as the extent of knowledge among the participants on eye health based on their education level.

## MATERIALS AND METHODS

This is a cross-sectional study that was conducted in the OPD of Ophthalmology, Dow International Medical College, Karachi, from January 2021 until August 2021. Every fifth patient was selected from the OPD. The target sample size was set at 384 with a confidence interval of 95%. In this study, the sample size was calculated by using OpenEpi, Version 3, and the prevalence was estimated as 50% due to no similar studies which we were able to find. A total of 390 subjects were ultimately recruited, which included both genders, and the age range was 18 years old and above. The patients not willing to participate in an interview (not giving consent) were excluded. Those patients with a language barrier were also excluded. Similarly, patients less than 18 years of age were excluded.

Informed verbal consent was taken from the candidates, and they were asked their personal details, including age, level of education, and ethnicity along with the remaining questions in the pro forma. The study tool was a questionnaire specifically used for this investigation. The reliability and validity of the questionnaire were checked by Cronbach alpha. The reliability and validity were thereby calculated at 0.85.

The questionnaire was divided into two sections: Demographics and Myths. Demographics included: age, gender, ethnicity (Sindhi, Urdu Speaking, Punjabi, Pathan, Balochi and Others), education (Matric, College or University Graduates, higher education [Masters, PhD]). The questionnaire is attached as a supplementary file. The "Myths" section consisted of 9 questions, and subjects answered them in "Yes," "No," or "I don't know. They were reported in frequencies.

All the demographic details were reported in frequencies and percentages for categorical variables and mean  $\pm$  standard deviation for normally distributed quantitative variables. Then, we compared the Myths questions with different levels of education and ethnicity by applying a chi-square or Fisher exact test. Kruskal-Wallis test was applied to compare age among educational groups after assessing the assumption of normality with the Shapiro-Wilk test. A p-value  $\leq 0.05$  was taken as statistically significant. The analysis was performed using SPSS version 23.

## RESULTS

The sample (n=390) consisted of 182 (46.7%) males and 208 (53.3%) females. Their ages ranged from 18 to 79 years with a mean age of  $36.44 \pm 14.18$  years.

All of the participants filled out the questionnaire. The descriptive statistics showed that the majority of the participants were in the matric category (n=203;52%). In terms of ethnicity, the largest group was Urdu-speaking individuals (n=138;35%) (Table 1).

**Table 1:** Demographic details of patients.

Patient Characteristics: (n=390)	Category	Frequency (%)
Age in years (mean $\pm$ standard deviation)	-	36.4 $\pm$ 14
Gender	Male	182 (47)
	Female	208 (53)
Education	Matric	203 (52)
	Graduates	133 (33)
	Higher Qualification	57 (15)
Ethnicity	Urdu	138 (35)
	Sindhi	124 (32)
	Punjabi	59 (15)
	Pathan	33 (9)
	Others	20 (5)
	Balochi	16 (4)

The majority of the participants believed that "dizziness is related to refractive error (n=263;67.4%). Additionally, many of the survey-takers reported that "fennel, misri, and badam are beneficial for eyesight" (n=247;63%). The statement, "Arq-e-Gulab can cure most eye diseases," was considered untrue by roughly half of the respondents (n=203;52%). The most common myth considered true among the respondents was: "Wearing glasses can worsen vision" (n=306;78.5%) (Table 2).

**Table 2:** The statement of patients regarding misconceptions and myths.

Misconception, Myth Statement	Yes n (%)	No n (%)	Don't know n (%)
Wearing glasses worsen your vision	56 (14.4)	306 (78.5)	28 (7.2)
Putting Surma/Kajal on can strengthen Eyes	158 (40.5)	192 (49.2)	40 (10.3)
Cataract can be cured by drops	73 (18.7)	220 (56.4)	97 (24.9)
Arq-e-Gulab can cure mostly eye disease	149 (38.2)	203 (52.1)	38 (9.7)
Fennel, Misri and Badam are beneficial for Eyesight	247 (63.3)	84 (21.5)	59 (15.1)
Soft diet is required after cataract surgery	142 (36.4)	104 (26.7)	144 (36.9)
Diabetes and HTN does not affect the Eye	115 (29.5)	242 (62.1)	33 (8.5)
Refractive error can be cured by drops	55 (14.1)	293 (75.1)	42 (10.8)
Dizziness is related to refractive error	263 (67.4)	95 (24.4)	32 (8.2)

Most of the subjects (n=192;49.2%) disagreed with the statement, "Wearing surma / kajal can strengthen eyes," and correctly declared it as a myth. Among them, the highly educated presented the greatest proportion (n=40;70.2%) of those reporting the statement as a myth.

**Table 3:** Myths or facts relation with education.

Statement		Education						p-value
		Matric		University Graduates		Higher Qualification		
		n	%	n	%	n	%	
Age in years (mean ± standard deviation)		40 ± 13		40 ± 13		42 ± 13		0.800*
Wearing glasses worsen your vision	Yes	37	18	15	12	4	7	0.300
	No	140	69	113	87	53	93	
	Don't know	26	13	2	2	0	0	
Putting Surma/ Kajal on can strengthen Eyes	Yes	98	48	45	35	15	26	0.030+
	No	79	29	73	56	40	70	
	Don't know	26	13	12	9	2	4	
Cataract can be cured by drops	Yes	45	22	23	18	5	9	0.056
	No	96	47	77	59	47	83	
	Don't know	62	31	30	23	5	9	
Arq-e-Gulab can cure mostly eye disease	Yes	102	50	37	29	10	18	0.002+
	No	74	37	86	66	43	75	
	Don't know	27	13	7	5	4	7	
Fennel, sugar loaf and almond are beneficial for Eyesight	Yes	133	66	79	61	35	61	0.240
	No	28	14	36	28	20	35	
	Don't know	42	21	15	12	2	4	
Soft diet is required after cataract surgery	Yes	84	41	38	29	20	35	0.030+
	No	38	19	41	32	25	44	
	Don't know	81	40	51	39	12	21	
Diabetes and HTN does not affect the Eye	Yes	75	37	23	18	17	30	0.340
	No	99	49	104	80	39	68	
	Don't know	29	14	3	2	1	2	
Refractive error can be cured by drops	Yes	37	18	11	9	7	12	0.090+
	No	136	67	109	84	48	84	
	Don't know	30	15	10	8	2	4	
Dizziness is related to refractive error	yes	152	75	81	62	30	53	0.300
	no	33	16	40	31	22	39	
	Don't know	18	9	9	7	5	9	

+Fisher-exact test was reported

\*Kruskal Wallis test was applied

Regarding the Arq-e-Gulab question: "Arq-e-Gulab (rose water) can cure many eye diseases," once again, the highly educated recognized the statement as a myth in the greatest proportion (n=43;75.4%). This is in contrast to undergraduates, of whom half (n=102;50.2%) of the participants agreed with the above statement. Statistical significance was also found between groups (p=0.002). For the statement, "Soft diet is required after cataract surgery", many (n=25;43.9%) of the highly educated subjects recognized it to be a myth whereas roughly the same proportion (n=84;41.4%) from the matric category agreed with it and regarded it as a fact.

Statistical significance was found when comparing subjects from the highly educated category who correctly identified the aforementioned statements as myths against the remaining groups (p=0.030) (Table 3). Regarding the statement, "Refractive error can be cured by drops," higher qualified individuals have overwhelmingly recognized it is a myth (n=48;84.2%) followed by a similar degree (n=109;83.8%) of graduate subjects, and many (n=136;67%) undergraduate subjects but only marginal statistical significance was found between groups (p=0.090).

Most individuals (n=306;78.5%) correctly indicated that it is not a fact that wearing spectacles can decrease vision. Among them, the Urdu-speaking ethnicity was highest in proportion (n=126;91.3%). The second question was about surma or kajal strengthening the eye, and most ethnic groups recognized it as a myth. Urdu speaking groups were highest in frequency declaring it as a myth (n=87;63.9%). The claim that "cataract can be cured by drops," was declared a myth by most of the groups, and amongst them, the Punjabi group was most prevalent (n=38;64.4%).

The Urdu-speaking group mostly (n=88;63.8%) disagreed that Arq-e-Gulab (rose water) can cure most eye diseases, and this was consistent with the Punjabi group (n=30;50.8%). Most of the individuals of all groups considered fennel, misri and badam as beneficial for eyesight. Sindhi-speaking groups were the highest represented (n=91;73.4%). Most individuals said it is a fact that a soft diet is essential after cataract surgery. Many from the Punjabi group (n=51;41.1%) selected "I don't know" regarding this (Table 4).

**Table 4:** Ethnicity association with myths and facts.

Statement		Ethnicity												p-value
		Sindhi		Urdu speaking		Punjabi		Pathan		Balochi		Others		
		n	%	n	%	n	%	n	%	n	%	n	%	
Wearing glasses worsen your vision	Yes	22	18	9	7	10	17	9	27	2	13	4	20	0.600+
	No	93	75	126	91	46	78	19	58	7	44	15	75	
	Don't know	9	7	3	2	3	5	5	15	7	44	1	5	
Putting surma / Kajal on can strengthen Eyes	Yes	73	59	37	27	18	31	18	55	8	50	4	20	0.160
	No	44	36	87	63	28	48	14	42	6	38	13	65	
	Don't know	7	6	14	10	13	22	1	3	2	13	3	15	
Cataract can be cured by drops	Yes	28	23	19	14	13	22	10	30	3	19	0	0	0.1230
	No	59	48	87	63	38	64	16	49	6	38	14	70	
	Don't know	37	30	32	23	8	14	7	21	7	44	6	30	
Arq-e-Gulab can cure mostly eye disease	Yes	59	48	37	27	24	41	14	42	8	50	7	35	0.750
	No	53	42.7	88	64	30	51	16	49	5	31	11	55	
	Don't know	12	10	13	9	5	9	3	9	3	18	2	10	
Fennel, misry and badam are beneficial for Eyesight	Yes	91	74	78	57	37	63	19	58	10	63	12	60	0.690
	No	16	13	40	29	11	19	9	27	2	13	6	30	
	Don't know	17	14	20	14	11	19	5	15	4	25	2	10	
Soft diet is required after cataract surgery	Yes	51	41	51	37	18	31	8	24	6	38	8	40	0.150
	No	34	27	44	32	6	10	10	30	4	25	6	30	
	Don't know	39	32	43	31	35	59	15	46	6	38	6	30	
Diabetes and HTN does not affect the Eye	Yes	37	30	38	28	20	34	12	36	4	25	4	20	0.550
	No	76	61	93	67	37	62	17	52	6	38	13	65	
	Don't know	11	9	7	5	2	3	4	12	6	38	3	15	
Refractive error can be cured by drops	Yes	21	17	18	13	2	3	7	21	3	19	4	20	0.260
	No	92	74	108	78	51	86	21	64	8	50	13	65	
	Don't know	11	9	12	9	6	10	5	15	5	31	3	15	
Dizziness is related to refractive error	Yes	90	77	81	59	42	71	24	73	11	69	15	75	0.550
	No	25	20	44	32	13	22	9	27	1	6	3	15	
	Don't know	9	7	13	9	4	7	0	0.0	4	25	2	10	

+Fisher-exact was reported

Most individuals correctly reported that diabetes and hypertension have an effect on the eye, especially the Urdu-speaking group which was most represented (n=93;67.4%). Additionally, the majority of individuals from the Urdu-speaking group correctly considered it a myth that refractive error could be cured by the drops (n=108;78.3%). The remaining groups followed this trend. The statement, “dizziness is related to refractive error,” was correctly identified as a fact, by all the groups; Sindhi speaking was the highest represented amongst all (n=90;72.6%) (Table 4).

### DISCUSSION

This study demonstrates the prevalence of certain health myths regarding the eye among a proportion of individuals entering the eye clinic. Despite the majority being knowledgeable about some of the most common myths prevalent in our culture, a concerted effort is still needed to rectify these misconceptions about eye health. This is evident in the fact that some patients fear that wearing glasses too often will weaken their eyesight. A previous study that investigated communities' perceptions of refractive errors in Pakistan showed that 69% of people feel that using spectacles would cause their vision to deteriorate [11]. Despite how very few trials have been

conducted on the prolonged effect of wearing glasses, there is no evidence to suggest that wearing glasses will worsen vision or lead to eye disease. This misconception about spectacles may arise anecdotally from different personal experiences with spectacles. People may develop a greater dependency on their spectacles and blame them as the culprit for their worsening vision. However, they are instead becoming more dependent because their lenses deteriorate with age. Unfortunately, this leads to conclusions about glasses worsening one's eyesight despite there being no causal relationship. This begs the question of whether other circulating myths and misconceptions regarding eye health may similarly impact the perception which patients have towards a physician's advice.

To explore such additional societal misconceptions, various publications have attempted to assess patient knowledge regarding the safety of laser pointers and Lasik [12, 13]. To date, we have not seen any article published that discusses these common myths related to eye disease specifically in the South Asian subcontinent collectively although there are articles that mention these myths individually. This is important to recognize since there are various myths concerning eye diseases that are more cultural and regional than global.

We assessed the beliefs and practices of subjects regarding ocular health, particularly in Pakistan. The use of 'kajal' (kohl), locally known as surma, is widely accepted as part of culture and tradition in Pakistan. It has been used as a cosmetic eyeliner since antiquity in the Middle East, Asia, and Africa; It is worn for several reasons such as beautification, to ward off the "evil eye," for its supposed benefits for improving visual acuity, and because it is encouraged within the Islamic religion [8]. Many kohl preparations have concerning amounts of lead contamination that pose a threat to frequent users. These high levels of lead exposure to anemia, kidney diseases, neurological disorders, and impaired child intelligence [14]. These health risks need to be stressed when educating the populace. National health services should implement testing and control of these products to protect at-risk populations.

Another common locally held belief concerns Arq-e-gulab, also known as rose water. This substance is thought to have beneficial anti-inflammatory properties for conditions such as dry eyes and conjunctivitis. However, there aren't any conclusive clinical studies with rose water therapy despite personal accounts of ocular health benefits. Only one clinical trial could be found concerning rose water: a commercial eye drop claiming to contain Damask rose and other herbs which showed effectiveness against infective and inflammatory ophthalmic diseases [15]. However, this does not identify whether the benefits were from solely the Damask, the other herbs, or a combination. Rose water may even cause side effects such as an allergic reaction in some individuals [16]. Patients should be counseled on the limited benefits of rose water usage and educated on more medically sound advice.

### CONCLUSION

Despite the persistence of myths and misconceptions among the general population, this study has demonstrated that laymen generally have a relatively reasonable level of knowledge in terms of safe eye care practice. Appropriate eye health messages need to be made more accessible to the general public at all levels of socioeconomic and educational backgrounds. Eye health pamphlets and posters can be distributed locally to dispel common myths and misconceptions.

### ETHICS APPROVAL

The study was approved by the ethical review committee of DUHS, Karachi Pakistan. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the Helsinki declaration.

### CONSENT FOR PUBLICATION

Verbal informed consent was obtained from every patient before being asked to fill out the questionnaire.

### AVAILABILITY OF DATA

Data sets generated during this study have not been made available online in respect of the confidentiality of each patient involved in this study. The data can be made available upon request to the corresponding author.

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### CONFLICT OF INTEREST

The authors declare no conflict of interest.

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### AUTHOR'S CONTRIBUTION

SA and RK contributed to the paper writing process while FS, and MN assisted in data collection. MB was the corresponding editor of this paper.

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