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Research Article

A SINGLE-BLIND, PLACEBO-CONTROLLED CLINICAL TRIAL OF LOCAL APPLICATION OF *KOHL-CHIKNI DAWA*-A UNANI COMPOUND FORMULATION IN THE PATIENTS OF PRE-MATURE SENILE CATARACT

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ABSTRACT

Objective: The present clinical trial aimed to assess the safety, preventive, and curative efficacy of the local KCD application in patients with pre-mature senile cataracts, as well as to provide an economic, safe, and effective alternative treatment for it.

Methods: The prospective single-blind, placebo-controlled trial was carried out at Majeedia Hospital, Hamdard University, New Delhi. The diagnosed patients with pre-mature senile cataracts were randomly allocated to three groups for local application of the KCD or placebo.

Results: Ninety-two patients completed the study period of 6 months. The results show that the KCD was effective in the general amelioration of the signs and symptoms of pre-mature senile cataracts. Treatment with the KCD in grade I of PS cataracts shows nil lens score in five patients (9.6%). Throughout the research, 44% of participants' vision remains stable. The treatment with the KCD has no effect on lens score or vision in patients with pre-mature senile cataracts of grades II and III.

Conclusion: The dose of the KCD in two sticks BID is safe, acceptable, and has no negative effects during the trial. The KCD improves visual loss in grade I PSC. The KCD is believed to affect the progression of early pre-mature senile cataracts. A multicentric trial of the test medicine on a bigger sample size for 5 years, as recommended by the WHO, will determine its efficacy in treating pre-mature senile cataracts.

Keywords: *Kohl Chikni Dawa*, Pre-mature senile cataracts, Lens score, Loss of vision.

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INTRODUCTION

The cataract is one of the significant causes of blindness globally [1]. The cataract is defined as a loss of lens transparency, which causes alteration of refractive properties and elevated light scattering, resulting in hazy vision or blindness [2].

The incidence of cataracts increases with age. It increases from 3.9% in 55–64 years old to 92.6% among those 80 years and above.

Surgery is the only effective treatment for cataracts, to remove the defective eye lens and replace it with an artificial lens. The most commonly used surgical method is known as Phacoemulsification conducted under local anesthesia.

As per 1995, estimates the population of blind people in the world is 38 million (0.7% of the total population) with additional 110 million people with visual impairment. Cataracts is still a significant cause of blindness making it 13–27% of all blind people, enormously increasing with age [3].

Blindness due to cataracts is a most significant problem in India, not only causing high human morbidity but also resulting in economic losses and social burden. As per survey reports of the WHO/NPCB (National Program for Control of Blindness), there is a backlog of over 22 million blind eyes in India, and out of these, 80.1% are blind due to cataracts.

The annual prevalence of cataract blindness in India is about 3.8 million. Presently, about 1.6–1.9 million cataract surgeries are performed annually in India [4].

The major thrust to tackle this problem has been given to performing an increased number of cataract surgeries with a better restoration rate of sight. The other thrust area is focused on delaying the onset and progression of cataracts by safe, economic, and easy medical therapy.

When there is no available therapy for delaying the onset and progression of cataracts; demand for herbal drugs as an alternate therapy is increasing in the world [5].

Cataracts are an irreversible protein degenerative disorder; it compels vision researchers to find preventive ways to manage cataract blindness. In this situation, the vision scientists have recommended the inclusion of phytonutrient plants, their compounds, and functional foods, to delay the onset and progression of the cataracts [6].

In this background, *Kohl Chikni Dawa* (KCD), a herbo-mineral compound formulation of Unani medicine for cataracts has been selected for clinical evaluation. This formulation is in the practice of Unani physicians for more than 200 years. This formulation has been taken from GOI-authenticated reference books under the D&C Act 1940 [7-9].

The present clinical trial was undertaken to evaluate the safety, preventive/curative efficacy of the local application of the KCD in patients of pre-mature senile cataracts, and to provide an economic, safe, and effective alternative treatment for it.

METHODS

Study design

The present prospective study was carried out in the Department of Moalejat, Faculty of Unani Medicine, Majeedia Hospital, Jamia

Hamdard, New Delhi. The clinical trial is a single-blind, randomized, placebo-controlled, comparative study to evaluate the efficacy of the local application of *Kohl Chikni Dawa* in senile pre-mature cataracts. The study was conducted for 3 years duration with protocol therapy for 6 months. The study is designed in the light of methods adopted as per the WHO recommendations.

Before conducting the study, the Institutional Review Board of Jamia Hamdard provided ethical clearance. (JHIRB-Reference No.04/01 dated 07.06.2001)

Diagnosis of cataract

Applying the JAP CCESG System (Japanese Co-operative Cataract Epidemiology Study Group), the cataracts are classified into the following:

The posterior subcapsular cataracts

The cataracts affecting the back of the lens are known as the posterior subcapsular cataracts. This has been graded according to the size of the opaque area.

Grade I (Early stage): An opaque area corresponding to the normal size of the pupil.

Grade II (Moderate stage): An opaque area more extensive than a normal pupil but smaller than a moderately dilated pupil.

Grade III (Advanced Stage): An opaque area more extensive than a moderately dilated pupil.

The nuclear cataracts

The opacity affecting the central part of the lens is known as the nuclear cataracts. This has been graded according to the size of the light scattering intensity of the lens through a slit-lamp examination.

Grade I (Early Stage): The light scattering intensity of the opacity is almost the same or slightly higher than that of a normal lens.

Grade II (Moderate Stage): The light scattering intensity of the opacity is the lightest than that of a normal lens.

Grade III (Advanced Stage): The light scattering intensity of the opacity is stronger than a normal lens.

The cortical cataracts

The opacities affecting the edges of the lens are known as cortical cataracts**.** This has been graded according to a roughly estimated opaque area in a maximally dilated pupil obtained from a retro illumination image by a slit-lamp examination.

Grade I (Early Stage): The opacities of the lens covering <20% area of the pupil.

Grade II (Moderate Stage): The opacities of the lens covering between 20% and 60% area of the pupil.

Grade III (Advanced Stage): The opacities of the lens covering more than 60% area of the pupil.

The mixed cataracts

This has been graded according to the different colors of the opaque area of the lens.

Grade I: Pale yellow.
Grade II: Yellow.
Grade III: Brown yellow
Grade IV: Brown, including reddish or black-brown [10].

The patients with poor vision and suspicious pre-mature senile cataracts were selected for the study. A detailed history (general and specific for an eye) of the selected patients was recorded in the clinical record form (CRF). The patient's eyes were observed for ophthalmological examinations, *viz*., visual field test and biomicroscopy slit-lamp examination. Pre-mature senile cataract was recorded as a photograph before and after three, and 6 months of treatment. The changes in size, position, and density of the premature senile cataracts were judged by examining the periodic sketches of the cataracts made from the visual impressions obtained by the bio-microscopy slit-lamp examination.

Test drug

Constituents of *Kohl Chikni Dawa*;
1. *Tootiya* (Copper sulfate-S.D. Fine Chem. Ltd. Mumbai)
2. *Sabun* (Hard soap-M. S. factory, Aligarh)
3. *Raal* (Resin of Shorearobusta Roth) [11]

The above ingredients were procured from the local market and authenticated at the Department of Chemistry, Faculty of Science, Jamia Hamdard, New Delhi.

Preparation of the KCD

The above ingredients were taken in a ratio of 1:20:1, and *Kohl Chikni Dawa* was prepared after quantification of the constituents under aseptic conditions. Hard soap was cut into pieces and heated on an iron pot; it turns into liquid form, and then the powder of copper sulfate was mixed into liquid soap. Moreover, finally, the powder of Shorea robusta was mixed in the liquid soap. The mixture was heated till it converted into dry ash. After cooling, the ash was powdered in a grinder, then it was filtered with a sieve of size 120 μ, and micro-fine powder was collected. The powder was stored in small bottles with a small glass stick and labeled as *Kohl Chikni Dawa* with a single asterisk (*).

Preparation of Placebo (Mustered Oil Smog-Ash)

An earthen pot was filled with mustard oil, and one end of the cotton wick was immersed in the oil with the other end placed on the mouth of the pot. The cotton wick was burned, and another earthen pot was placed on it to collect smoke inside it. After the complete burning of the mustard oil, the smoke ash was collected from the other pot and stored in small bottles with a small glass stick and labeled as Placebo with a double asterisk (**) [9,11].

Dose and administration

The packs of *Kohl Chikni Dawa*/Placebo were given to the patients with directions to apply two sticks of the drug BID for 6 months. In selected cases of Group I and Group II, a placebo was applied on one eye (control eye) and *Kohl Chikni Dawa* was applied on the other eye (test eye). In Group III patients, the KCD was applied on one side only, and the response of PMC was noted. After that, they were compared to the similar stages of Group I (control) and Group II (control) or the previous visits.

Participants

The patients with pre-mature senile cataracts were selected based on the definition of cataracts defined under diagnostic criteria. Patients of either sex in the age range of 40–70 years with all types of pre-mature senile cataracts (posterior subcapsular, nuclear, cortical, and mixed), who gave voluntary written informed consent (approved by JHIRB) to participate in the study were allowed to join the study.

After the diagnosis of the premature senile cataract, all the patients were randomly allocated to the following groups:
Group I: Nearly similar stages of the cataracts in both eyes.
Group II: Different stages of the cataracts in both eyes.
Group III: The patients who operated for cataracts before/during the study period on one side/did not have cataracts on one side/other eye diseases.

Exclusion criteria

The patients were excluded from the study based on the criteria of age: below 40 years and above 70 years.

The patients suffering with advanced stage (Grade-III), hypermature stage (Grade-IV), brown, including reddish or black-brown, using contact lenses for refractive errors were excluded from the study. The patients diseased with traumatic (mechanical, chemical, radiation, and electric), systemic, and complicated cataracts were excluded from the study. The patients suffering with retinopathy, retinal detachment, color blindness, and any inflammatory condition of the eyelids or eyeballs were excluded from the study. The patients suffering with a physical handicap or disability, pregnant women with a history of severe head injury or neurological disorder, or psychiatric illness that may weaken their capability to deliver written informed consent were disqualified from the study. The patients using a drug for an eye disease were also excluded from the study.

Withdrawal criteria

The patients with a record of irregular follow-up or irregular application of the drug for more than 1 month were taken in the withdrawn cases from the study. The Patients with complaints of any allergy or hypersensitivity to the KCD were taken in the withdrawn cases from the study.

The data of the patients was considered for analysis if at least 70% quantity of the drug was used by the patient. Otherwise, the data was not considered for analysis [12,13].

Time frame

01st February 2000–31st May 2003.

Laboratory procedures

On the 1st day of the treatment, three and 6 months after the start of the treatment, the following tests were conducted in the laboratory. Pre- and post-treatment tests included a Hemogram, post-prandial and fasting blood sugar assessments, LFT, KFT, and a urine R/M analysis.

Follow-up schedule/period of the patients

Following a satisfactory examination and laboratory results, each patient was given a supply of Kohl Chikni Dawa (a placebo) for one week and instructed to report to the outpatient department (OPD) on the second appointment (day three). Every patient underwent an ophthalmological examination at every visit during the duration of the trial (Table 1).

Outcome

Efficacy outcome

A. Primary Evaluation Criteria of the Assessment of Effect of Therapy: The results were recorded as follows:
   1. The effect of the treatment on signs and symptoms of pre-mature senile cataracts: The effect of the treatment on signs and symptoms of cataract patients' before and after treatment were recorded in CRF.
   2. The effect of the treatment on lens score: The effect on lens score was recorded as follows:

   0 = No Opacity, 1 = Grade I, 2 = Grade II, 3 = Grade III, 4 = Grade IV.
   3. The effect of the treatment on visual acuity: The outcome of the treatment on visual acuity was noted as follows:

I. Clinical Improvement: Improvement of at least one line of the Snellen chart in comparison to the control eye or previous visit was recorded as clinical improvement in visual acuity.

Table 1: Follow-up schedule/period of the patients

Visits	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
Days	1	3	7	11	15	30	45	60	90	120	150	180

II. Subjective Improvement: The report of vague visual improvement without any change in visual acuity or lens opacity was recorded as a subjective improvement.
III. Stationary: No change in visual acuity was recorded as stationary visual acuity.
IV. Deterioration: The fall of at least one line of the Snellen chart in comparison to the control eye or previous visit was recorded as a deterioration of visual acuity.
V. Side Effects: Any hypersensitivity, allergy to the KCD, or any other side effects were noted during the study [12,13].

B. Secondary Evaluation Criteria
   1. Efficacy of the test drug was evaluated in two age groups: 40–55 years and 56–70 years.
   2. The efficacy of the test drug was evaluated in different types of cataracts.

C. Safety outcome: The safety of the test drug was assessed by comparing LFT and KFT before and after treatment. Moreover any type of hypersensitivity or adverse effects after the treatment with the test drug were recorded to assess its safety.

Statistical analysis

The data of each group was recorded as Mean ± SD. Comparison of data within visits or with previous readings was calculated by the Wilcoxon Signed Ranked Test (on paired data). ANOVA was performed followed by Dunnett's test among the treatment groups. A value of $p<0.05$ was considered statistically significant. The student's pair t-test was performed to compare the visual acuity of patients before and after treatment in different grades of pre-mature senile cataracts. A value of $p<0.05$ was considered statistically significant.

RESULTS

One hundred eighty-eight patients with pre-mature senile cataracts were enrolled in the study. Ninety-six patients failed to complete the clinical trial for various reasons. Ninety-two patients completed the 6-month duration of the clinical trial. Twenty-five patients were in Group I, six patients were in Group II, and sixty-one patients were in Group III.

Demographic data

In ninety-two patients who completed the study period of 6-months, nineteen males and twenty-four females were between forty and 55 years old, and 26 males and 23 females were between 56 and 70 years old.

Primary evaluation

1. Effect of the KCD/Placebo on signs and symptoms of pre-mature senile cataracts

Treatment with *Kohl Chikni Dawa* is effective in the general amelioration of the signs and symptoms of pre-mature senile cataract. The KCD has an effect on itching 75%, watering, F.B. sensation 50%, eye aches 33.3%, photophobia, distortion of objects 25%, headache 10%, and loss of vision 2.10%.

The KCD is effective in the general amelioration of signs and symptoms of the PMC patients suffering from the disease from 6-months to 1 year. The KCD is non-effective in general amelioration of signs and symptoms of PMC patients suffering from the disease for more than 1 year.

The placebo treatment has a non-significant effect on the general amelioration of PMC patients' signs and symptoms, except for some effect on object distortion (Table 2).

2. Effect of the KCD/Placebo on the Lens score in different grades of pre-mature senile cataracts

The treatment with the KCD had no effect on the lens score in grades II and III of the pre-mature senile cataracts, but it had a substantial effect

on the lens score (Nil score) in five patients (9.6%) with grade I PMC. (Fifty-two cases).

The placebo treatment has no effect on the lens score in patients of all three grades of pre-mature senile cataracts (Thirty-one cases) (Table 3).

3. Effect of the KCD/placebo on the vision on reading the Snellen chart in different groups of pre-mature senile cataracts

For Groups I, II, and III of PMC patients, the treatment with the KCD has a statistically non-significant effect as a clinical improvement on the vision when reading the Snellen chart ($p<0.05$).

For patients in groups I, II, and III of the PMC, the treatment with a placebo has a statistically non-significant effect as a clinical improvement on the vision when reading the Snellen chart ($p<0.05$) (Table 4).

4. Effect of the KCD/placebo on the vision on reading the Snellen chart in different grades of pre-mature senile cataracts

In Grades I and II of pre-mature senile cataracts, the treatment with the KCD had a statistically non-significant effect as a clinical improvement on the vision upon reading the Snellen chart. ($P<0.05$)

When it comes to preventing vision loss in grade I of pre-mature senile cataracts, the KCD treatment is more effective than grade II.

In grade II of pre-mature senile cataracts, placebo treatment is statistically non-significant on the vision as a clinical improvement when it comes to reading the Snellen chart ($p>0.05$) (Table 5).

5. Effect of the KCD/Placebo on the vision improvement in the pre-mature senile cataracts

Subjective improvement is reported in forty-seven cases (51%), clinical improvements in two cases (2.1%), stationery vision in forty cases (44%), deteriorating vision in three cases (3.2%), and no patient has any negative effects after the treatment with the KCD. (A total of Ninety-two cases)

The treatment with placebo resulted in two cases of subjective improvement (6.4%), zero cases of clinical improvement, fifteen cases of stationary vision (49.3%), fourteen cases of vision deterioration (46.2%), and no adverse effects in any patient (Table 6).

6. Response of the patient after the treatment

The treatment with the KCD indicates good response in one case (1.9%), fair response in one case (1.9%), poor response in forty-four cases (46.6%), and no response in forty cases (50%). (Ninety-six cases)

The treatment with a placebo shows no response in all cases (100%). (Thirty-one cases) (Table 7).

Table 2: The effect of KCD and Placebo on signs and symptoms of pre-mature senile cataracts in the KCD and Placebo groups

S. No.	Signs, and Symptoms	Number of cases in the KCD Group				Number of cases in Placebo Group			
		BT	AT	Nos. of Nil cases	%	BT	AT	Nos. of Nil cases	%
1.	Loss of vision	92	90	02	2.10%	31	31	00	0%
2.	Headache	22	20	02	10.00%	09	09	00	0%
3.	Eye ache	12	08	04	33.3%	04	04	00	0%
4.	Itching	04	01	03	75%	Nil	Nil	Nil	0%
5.	Photophobia	18	13	05	25%	12	12	00	0%
6.	Blepharospasm	02	02	00	0%	Nil	Nil	Nil	Nil
7.	Watering	04	02	02	50%	01	01	00	0%
8.	Discharge	Nil	Nil	Nil	0%	Nil	Nil	Nil	Nil
9.	Redness	Nil	Nil	Nil	0%	Nil	Nil	Nil	Nil
10.	F.B. sensation	02	01	01	50%	02	02	00	0%
11.	Distortion of object	04	03	01	25%	03	02	01	33.3%
12.	Diplopia	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
13.	Myokymia	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
14.	Any other comp	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

BT=Before Treatment, AT=After Treatment

Table 3: The Effect of the KCD/Placebo on the Lens score in different grades of the pre-mature senile cataracts

Grades of Lens Score	KCD Group (Nos. of cases)			Placebo Group (Nos. of cases)		
	BT	AT	Number of Nil Cases	BT	AT	Number of Nil Cases
Grade-I	52	48	05	00	00	00
Grade-II	40	44	00	31	26	00
Grade-III	00	00	00	00	05	00
Total	92	92	05	31	31	00

BT=Before Treatment, AT=After Treatment

Table 4: The Effect of the KCD/Placebo on the vision on reading the Snellen chart in different groups of the pre-mature senile cataracts

Vision	Mean of Visual Acuity on reading the Snellen chart (in lines)				
	Group I		Group II		Group III
	KCD treated eye	Placebo treated eye	KCD treated eye	Placebo treated eye	KCD treated eye
Improvement	-	-	-	-	2^{NS}
Fall	1^{NS}	13^{NS}	-	3^{NS}	5^{NS}

Group 1=25 patients, Group II=6 patients, Group III=61 patients

$^{NS}p>0.05$(statistically non-significant as compared to baseline

Table 5: The Effect of the KCD/placebo on the vision on reading the Snellen chart in different grades of pre-mature senile cataracts

KCD/Placebo Treatment	Grades of Cataract	Visual Acuity on the reading of the Snellen chart			
		BT Mean±SD	AT Mean±SD	p-Value	Significance
KCD Treated eye	Grade I	39.1957 18.83292±3.848	39.4565 18.95269±3.873	0.4197	The result is non-significant at p<.05
	Grade II	35.3548 19.87793±6.998	39.7097 17.52637±6.17	0.3253	The result is non-significant at p<.05
	Grade III	00000	00000	00000	The sample size is too tiny for the calculation
Placebo Treated eye	Grade I	Nil	Nil	Nil	-
	Grade II	39.7097 18.52637±6.998	35.3548 18.83292±6.998	0.4152	The result is non-significant at p<.05
	Grade III	0000	00000	Nil	The sample size is too tiny for the calculation

Table 6: Effect of the KCD/Placebo on vision improvement in pre-mature senile cataracts

Treatment	Number of cases	Vision Improvement				
		SI	CI	S	D	SE
KCD	92	47 (51%)	02 (2.1%)	40 (44%)	3 (3.2%)	Nil
Placebo	31	02 (6.4%)	Nil (0%)	15 (49.3%)	14 (46.2%)	Nil

SI=Subjective Improvement, CI=Clinical Improvement, S=Stationary, D=Deteriorated, SE=Side Effect

Table 7: Response of the patients after the treatment (KCD/Placebo)

Treatment	Response of the patients				
	1	2	3	4	Total
KCD	01 (1.9%)	01 (1.9%)	44 (46.6%)	46 (50%)	92
Placebo	Nil	Nil	Nil	31 (100%)	31

1: Good Response, 2: Fair Response 3: Poor Response, 4: No Response

B. Secondary Evaluation
   1. Evaluation of the efficacy of the test drug between two age groups:
      The efficacy of the KCD remains unchanged in any age group: 455 years and 567 years.
   2. Evaluation of the efficacy of the test drug in different types of cataracts
      The efficacy of the KCD is equal in the different types of cataracts: subcapsular, nuclear, cortical, and mixed.

C. Safety Outcome

The dose of the KCD in two sticks of BID is safe, acceptable, and has no negative effects during the trial.

DISCUSSION

Safety is the primary concern in the long-term pharmacotherapy of cataracts. To reduce the side effects of long-term pharmacotherapy and to achieve a sufficient concentration of drug penetrating the lens, topical application is more effective than systemic administration [14]. Unani Medicine has prescribed a chain of formulations for topical application in various ophthalmic diseases, including KCD for *Nuzoolul Maa* (Cataracts) [15].

Kohl-Chikni Dawa is a herbo-mineral formulation with a history of its medicinal use in corneal opacity and cataracts dating back more than 200 years. The result of a pre-clinical animal study shows that it is safe for ophthalmic use in humans [16]. In a clinical study, it was reported that topical ophthalmic administration of KCD is safe after 6-months [17].

The pathophysiology behind the development of senile cataracts is multifaceted and not fully explained yet. Moreover, this is associated with numerous factors affecting the lens over many years.

The main factor for cataractogenesis is the damage to the crystalline lens caused by free radicals and reactive oxygen/nitrogen species. The increased generation of ROS accelerates the production of inflammatory cytokines like IFN γ in the lens through the MAPK pathway [6].

IFN-g causes the apoptosis of lens epithelial cells and this leads to the development of cataracts [18].

The other important factor for cataract formation is copper, one of the ingredients of the test formulation.

Copper is necessary for normal physiological functions of lenses like the activity of numerous enzymes such as cytochrome oxidase, superoxide dismutase, and uricase. The excess of copper in cataractous lenses may oxidize the sulfhydryl group to disulfide, leading to a reduction of copper that may generate oxygen radicals [19].

Copper's involvement in cataract formation is debatable. In one investigation on Cu levels in vertebrates' cataractous lenses, there was no association between Cu level and the cataract, and there was no difference between normal and cataractous lenses [20].

Various researchers have documented both low [21] and high [22] levels of Cu in cataractous lenses. A study found that elevated copper levels in the lens decrease the activity of lactate dehydrogenase, which is responsible for cataract formation [23].

A study discovered that non-steroidal anti-inflammatory medicines, such as aspirin, sulindac, and naproxen eye drops can delay the onset and progression of cataracts in various models of cataractogenesis while having no severe side effects after long-term use [24].

Though animal studies demonstrated that the local application of 3% KCD solution has anticataract effect (lens opacification) in naphthalene, alloxan, and galactose-induced cataract models [25-27], the effect of the KCD on the lens score and the vision in the patients is statistically non-significant, with 51.1% of the patients reporting subjective improvement in the vision and few cases of clinical improvement.

The KCD's constituents (Tootiya, Sabun, and Raal) have Mohallil-e-auram, Daf-e-Taffun, and Jali effects [28-30].

The synergistic Mohallil-e-auram (anti-inflammatory) and Daf-e-Taffun (antiseptic) actions of Tootiya (copper sulfate), Sabun, Raal, and

Jali (detergent) actions of Sabun may be responsible for the cataract preventative effect, as well as the general improvement of signs and symptoms of pre-mature senile cataracts.

Given the complex pathophysiology and delayed development course of senile cataracts, it is difficult to draw conclusions about the efficacy of the KCD on pre-mature senile cataracts in a short period of 6-months.

CONCLUSION

The dose of the KCD in two sticks BID is safe, acceptable, and has no negative effects. Kohl Chikni Dawa is useful in improving the overall signs and symptoms of pre-mature senile cataracts.

The effect of the KCD on vision is statistically insignificant, with subjective improvement of the vision in the vast majority of patients and only a few examples of clinical improvement.

The KCD is more effective in treating vision loss in pre-mature senile cataracts grade I, with a 9.6% improvement in the vision. The KCD has the ability to slow the progression of early pre-mature senile cataracts since the vision remains stable in 44% of cases, with few cases of visual impairment during the research period.

A multicentric trial of the test medicine on a bigger sample size for 5 years, as recommended by the WHO will determine its efficacy in preventing the progress the pre-mature senile cataracts and clinically improving vision of the PMC patients [31].

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AUTHORS' CONTRIBUTIONS

Zehra Zaidi developed the study, authored the main manuscript text, and analyzed the data. Abdul Nasir prepared the tables, figures, and reviewed the article.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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