Original Research Article

Disproportionate poor Visual outcome post Cataract Surgery in Tobacco addicts in a rural North Indian population of Uttar Pradesh

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Abstract

Background: There are approximately 267 million tobacco users in India.Tobacco use is more prevalent among men and rural illiterate population belonging to low Socio-economic strata. The most prevalent form of tobacco use in India is smokeless tobacco eg. Khaini, Gutkha, Zarda etc which are manufactured as cottage small scale industry, hence, available easily followed by bidi smoking which is more common in rural areas as compared to urban areas. Many people don't realize that tobacco use can lead to vision loss. It increases the risk of Age related Macular degeneration, Cataracts, Glaucoma, Diabetic retinopathy and Dry eye syndrome which is further aggravated if accompanied with poor nutrition. Carcinogenic, Cardiovascular etc health hazards of tobacco use have been extensively advertised and studied but,its hazardous effects on Ocular health needs to be extensively highlighted to prevent blindness/low vision and thereby preventing physical, social and economic burden on the society.**Materials& Methods:** This is a Community based study involving 220 patients having Immature cataracts with H/O chronic tobacco use from rural population of Uttar Pradesh in North India coming from low Socio-economic strata with no major Ocular pathology who underwent Cataract surgery (Manual Small incision cataract surgery/Phacoemulsification) with best input in form of surgical techniques & skills, equipments,material used and uncomplicated surgeries. These patients were subjected to questionnaire in their local language to check the lifestyle & intake of tobacco either in form of bidi smoking as well as consuming Gutkha/Khaini. Comprehensive & extensive Ocular examination was performed preoperatively and post operatively.Serum Vitamin B6, Folic acid and B12 levels were checked to assess nutritional status of these patients. Best corrected visual acuity(BCVA) preoperatively as well as postoperatively was disproportionate to the grade of cataract and best surgical input.There was no awareness of Ocular health hazards in these patients subsequent to chronic tobacco use in form of bidi smoking accompanied with Gutkha/Khaini consumption and their nutritional status was poor.These patients were informed of poor visual prognosis preoperatively as well as postoperatively and were counseled extensively against tobacco use and its ocular health hazards.**Results:** The visual outcome in these patients was not good. None of the patients in this study achieved Visual acuity better than 6/24 despite best surgical input. There was colour vision deficiency and Visual field defects in most of the patients. All had a very strong history of chronic bidi smoking along with Gutkha/ Khaini consumption and had Vitamin B6,Folic acid & B12 deficiency indicating poor nutritional status.**Conclusion:** Lack of awareness,low socioeconomic status,ignorance,easy availability of tobacco products leads to tobacco addiction especially in rural population.Chronic tobacco use in any form associated with Nutritional deficiencies can lead to permanent low visual outcome despite uncomplicated best surgical input and therefore,extensive multisectorial efforts are needed to highlight and emphasize the ocular health hazards of tobacco abuse at the community level to protect people from evil of tobacco abuse.

Keywords: Tobacco abuse,Bidi smoking,Gutkha/Khaini, Cataract surgery,Poor Vision

Background

There are approximately267 million tobacco users in India(Men-42.4%, Females-14.2%).The most prevalent form of tobacco use in India is smokeless tobacco eg. Khaini, a tobacco lime mixture used by every ninth adult(11.2%) followed by bidi smoking done by 7.7% of adult Indians while Gutkha, tobacco,lime areca nut mixture ranks third(6.8%). The Global adult tobacco Survey2(GATS2) released by the Ministry of Health & Family welfare shows that,every tenth adult in India smokes tobacco-11.9% in rural,most commonly in form of bidis and 8.3% in urban areas. 30.2% of adults are exposed to secondhand smoke in indoor workplaces. Each year, tobacco use kills about one million Indians[1-3].

Bidi industry in India is predominantly an unorganized sector. It is a traditional method of tobacco abuse in India because, they are inexpensive and easily available. Bidi consumption outspaces conventional cigarettes, accounting for 48% of all Indian tobacco consumption. Bidis outsell cigarettes by a ratio of 8:1 in India.

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India has the largest number of smokeless tobacco users in the world in form of Gutkha/Khaini/Zarda etc and is the commonest cause of tobacco use ,being invisible to others, inexpensive and easily available. It contains carcinogens & is highly addictive, is considered responsible for oral cancer and other severe negative health effects. It is marketed under the guise of a "safer" product than cigarettes and reported to have both stimulant and relaxation effects. Easy access and extremely low cost leads to early addiction and those in the lower socioeconomic populations are at increased risk[4].

Tobacco use especially smoking induces systemic oxidative stress in humans. Muscles are a major depot of vitamin B6 and a depletion of these depots may reduce circulating Vitamin B6. Higher oxidative stress, reduced muscle mass and overall malnourishment among smokers leads to lower concentrations of circulating folate,B2, B6 and B12.Nutritional deficiency in rural patients belonging to low socioeconomic strata further deteriorates the Ocular and general health of these individuals.Smoking tobacco decreases oxygen levels in the body and restricts blood flow. Even smoking just one cigarette a day can compromise the body's ability to send nutrients and oxygen through the bloodstream, which are both vital to surgical recovery. If a surgical site does not receive the nutrients it needs, healing can take longer. Complications such as infection also become more likely without proper nutrients and a timely recovery.

Materials and Methods

The aim of this study was to evaluate the undiagnosed hazardous effect of chronic tobacco use on visual outcome post cataract surgery in patients belonging to low socioeconomic status in rural North Indian population in State of Uttar Pradesh where there is less awareness & preponderance of tobacco addiction.

During the study,we selected 220 patients with immature Cataracts using tobacco (in form of smoking and/or consumption of smokeless tobacco) from rural population of Uttar Pradesh over a period of one year.These patients were subjected to questionnaire in their local language to assess the lifestyle & intake of tobacco in form of bidi smoking as well as gutkha/khaini consumption.

Questionnaireincluded:

1. H/O any chronic disease
2. Occupational background
3. Monthly/ daily family income
4. Duration of tobacco use(smoking/smokeless tobacco)
5. Number of bidis smoked per day
6. Number of pouches of Gutkha/Khaini consumed per day
7. Money spent in buying tobacco products per day
8. Daily expenditure on food
9. Dietary habits
10. H/O Alcohol intake
11. Family H/O Tobacco use/ alcohol intake

Preoperative assessment

1. Best corrected visual acuity(BCVA) using Snellens chart
2. Intra-ocular pressure(IOP) measurement by noncontact tonometry/Applanation tonometry in certain cases
3. Colour vision assessment by Ishihara Plates
4. Slit lamp examination for anterior segment evaluation
5. Fundus evaluation by +90D lens/Indirect Ophthalmoscopy
6. Keratometry
7. Intraocular Lens Power calculation(using Immersion technique) by A scan
8. B scan to further rule out any major Retinal pathology
9. Serum Vitamin B6, Folic acid and Vitamin B12 levels[5-9]

Patients reported to our OPD for mainly decreased vision either in one or both eyes.They were segregated for our study based on Exclusion & Inclusion criteria and patients diagnosed with U/L or B/L Cataracts underwent Cataract surgery either by SICS or Phacoemul-sification.All the patients included in the study had uneventful good cataract surgery.

Inclusion criteria

1. Immature uncomplicated cataracts
2. Clear Corneas
3. Normal IOP range(10-21mm Hg)
4. No major Anterior and Posterior segment Pathology

Exclusion Criteria

1. Mature and Hypermature cataracts
2. Patients with postoperative complications
3. Patients with post operative astigmatism of more than ±2 D astigmatism
4. Major Ocular Pathology
5. Underlying systemic conditions like Diabetes Mellitus and Hypertension

Postoperative assessment

1. BCVA at day 1,3,7,and 30th postoperative day
2. Colour vision after 30th postoperative day
3. Fundus evaluation on day 1,7 and 30th postoperative day
4. Visual field examination by Humphrey 24-2 perimetry after 30th postoperative day.

Results

Demographic profile

Table 1: Age of Patients

Sr. No.	Age (Years)	Number of Patients
1.	50-55	47
2.	55-60	62
3.	60-65	57
4.	65-70	36
5.	70-75	18

Table 2: Gender of Patients

Number of Patients	**220**
Male	162
Female	58

Table 3: Pre Operative Assessment

Sr. No.	Causes for inclusion of patients in study	Number of Patients
1	Bidi smoking with gutkha/Khaini consumption	220
2.	Disproportionate Defective Vision	220
3.	Fundus abnormalities like Temporal palor of optic disc,dull macula, Generalized or localized Chorioretinal degeneration as observed with+90D lens/Indirect Ophthalmoscopy	167
4.	Defective Visual fields (checked after 30th postoperative day) like central,paracentral ,centrocecal scotomas or generalized depression of visual fields	149
5.	Defective colour vision	164

Table 4:Postoperative Assessment

Sr. No.	Causes for inclusion of patients in study	Number of Patients

1.	Disproportionate Defective Vision	220
2.	Fundus abnormalities like Temporal palor of optic disc,dull macula, Generalized or localized Chorioretinal degeneration as observed with+90D lens/Indirect Ophthalmoscopy	167
3.	Defective Visual fields(checked after 30th postoperative day) like central, paracentral,centrocecal scotomas or generalized depression of visual fields	149
4.	Defective colour vision	164

Table 5:Postoperative Best Corrected Visual Acuity (BCVA)

BCVA	Day 1	Day 3	Day 7	Day 30
Finger Counting Less than 5mt	92	54	52	36
Finger Counting 5 mt to 6/60	70	108	110	128
6/60 to 6/24	30	38	38	56

Final screening was done after 30th postoperative day where,the study showed 16.36% patients with BCVA less than Finger counting(FC) 5meters, 58.18% patients with BCVA between FC 5meters to 6/60 and 25.45% patients with BCVA between 6/60 to 6/24.None of the patients had visual acuity better than 6/24 despite best surgical input.
Preoperative BCVA was disproportionate to their grade of cataract. Visual prognosis was explained in detail to the patients preoperatively. Postoperatively, the visual outcome was not good as expected along with colour vision deficiency and visual field defects in many of these patients. All these patients had a strong H/O Chronic tobacco use in form of bidi smoking and smokeless tobacco consumption(Gutkha/Khaini) for more than 20years along with poor nutritional status[9-13]

These patients were counselled extensively regarding their visual outcome,discouraging them against tobacco use by explaining the Ocular health hazards and for maintaining proper nutritional status.Though,it was a basic study using the basic equipments, tools and methods, but, few patients discontinued tobacco use with their determined efforts over a period of time and,in turn became local counselors in their community,which encouraged us to publish this paper.

Discussion

Tobacco consumption is a huge public health issue in India and its impact is especially devastating among the poor. Smoking is an established risk factor for cataract, which is the leading cause of visual impairment in the world, responsible for more than 50% of world blindness. The World Health Organization Prevention of Blindness and Deafness Program has estimated that 20 million people are blind from cataract and a further 82 million have low vision due to cataract.
The present study was aimed to evaluate the undiagnosed hazardous effect of Tobacco consumption on visual outcome following uncomplicated and good cataract surgery(SICS/Phacoemulsification) in patients belonging to low Socio-economic status in rural North Indian population of Uttar pradesh, where, there is lack of awareness and more preponderance of addiction.
The patients were diagnosed on the basis of preoperative and postoperative evaluation of Best corrected visual acuity(BCVA), Colour vision and Visual fields.
Male:Female ratio is 73.6 : 26.3 with more male preponderance as they are more exposed to Tobacco Culture.Females have restricted approach to these abuses.
The Questionnaire was designed to evaluate the complete social structure to reveal the complete Socio-economic strata of patients, level of education,duration of tobacco use,their nutritional status and daily habits and their awareness about harmful effects of tobacco especially on their eyes.The patients were subjected to direct and indirect questions to reveal the income left to be spend on their food intake after their expenditure on Tobacco consumption.

Out of 220 patients,164 had BCVA<6/60 and only 56 patients improved to BCVA 6/24 on 30th postoperative day which was not a encouraging result compared to the grade of cataract.

Fundus examination revealed Temporal Palor of Disc,Dull Macula, Generalized/Localized Chorioretinal degeneration in 75.9% of patients preoperatively as well as postoperatively.
Colour Vision abnormality was observed in74.54% of patients pre and postoperatively.Defective Visual Fields(done postoperatively) were seen in 67.7% of patients.
Almost all these patients were consuming tobacco in form of Bidis together with Gutkha/Khaini. Average consumption was more than 15 bidis and 6 pouches of Gutkha/Khaini daily over an average of more than 20 years duration, some even consuming it since their teenage.
Any patient with postoperative astigmatism of more than ± 2D was excluded from study to eliminate astigmatism as a cause of low vision postoperatively.
There was deficiency of Vitamin B6,Folic acid and Vitamin B12 in all these patients and their overall nutritional assessment was poor.
Bidi is a thin South Asian Cigarette made of 0.2 to 0.3 gm of tobacco flake wrapped in a tendu or temourni leaf, a plant native to Asia (Diospyroxmelanoxylon) and secured with coloured threads at both ends.Since, it is a cheap form of tobacco consumption,it is extremely popular among the poor.
Bidi cigarettes contains 3 to 5 times more nicotine than traditional cigarettes. Bidi cigarettes contains more tar and carbonmono-oxide than regular cigarettes.Bidi smokers breathe in higher level of toxins because bidis don't have chemicals to help combustion.A regular cigarette takes the average smokers about 9 puffs to finish. With bidis,smokers puff approximately 28 times. Bidi industry in India is a age old industry which is unregulated and largely home based.
Gutkha/Khaini is a chewing tobacco lime preparation used popularly in India in low Socio-economic strata.It is consumed by placing a pinch of it between the gum and cheek and gently sucking and chewing.It is cheap and easily available.So,it is logical to presume,that bidi smokers and Gutkha/Khaini chewers are at risk of becoming highly Nicotine dependent.
Tobacco consumption in any form is a huge public health issue in India and its impact is especially devastating among the poor. Despite mass media availability,the awareness regarding health hazards and specific tobacco control measures is below expectation. Approximately,70% of Indian population is rural and there is dire need for smoking cessation counseling services across the length and breadth of country.Tobacco control programs need to develop strategies to address different subgroups among the users.
Some of the existing myths,especially in rural Indians are:Tobacco consumption relieves anxiety,induces feeling of pleasure and decreases oro-dental pain& swelling. In addition,social norms,easy availability,cheap price,acceptability and advertisements also influence tobacco use especially in males and hence,the gender disparity.Tobacco consumption is higher among the less educated older age groups, agricultural and labour workers[14-19]

Smoking cessation decreased the risk with time, indicating that the lens has some ability to repair protein damage with time, probably by halting oxidative stress, although it takes longer for the lens to recover with higher smoking intensity[20-23]

Conclusion

The Carcinogenic effects of smoking or chewing tobacco has been heavily advertised but,there is less awareness regarding its harmful effects on eyes. Easy access and low cost leads to early addiction. Chronic tobacco use in any form associated with Nutritional deficiencies can lead to permanent low visual outcome even after uncomplicated best cataract surgery.Smoking cessation may decrease the risk of cataract, but the risk among former smokers persists for decades. Since smoking is also related to other ocular diseases, strategies to prevent smoking and promote smoking cessation are important, and eye care professionals should encourage people to stop smoking. Therefore,it is essential to educate the community extensively regarding the Ocular health hazards of Tobacco abuse with the combined efforts of Government/Public volunteers /NGO's/local leaders/Medical personels to protect people from the evil of tobacco abuse.

Limitations

This is a preliminary community study using the basic equipments, tools and methods available, based on interview of the respondent(Questionnare based) and conclusive result is mainly on the quantitative BCVA, Colour vision and Visual Fields assessment after 30th postoperative day.

Qualitative tests like OCT, Fundus Fluorescein Angiography, Fundus photos etc could have been added for the better assessment of disproportionate visual outcome post cataract surgery in tobacco users but,since the study was conducted on uneducated patients from low socioeconomic status,so,the mental, physical and financial compliance would have been very tedious for the patients..

Recommendations

This study was aimed to additionally educate these patients by questionnaire and create awareness of ocular hazards due to chronic tobacco use. Postoperative poor visual outcome following chronic tobacco use lead to cessation of tobacco use in some of these patients and who,in turn have become preachers to their local community for preventing tobacco use. This small change in the community encouraged us to publish this paper so that Ophthalmologists, Optometrists and local health workers can bring similar positive changes in the community in their area of practice**.**

Lack of awareness of harmful ocular effects of tobacco intake was observed during this study, so, more information, education and communication programmes with the aid of local folk media ie. story telling,puppetry shows& skits, direct and indirect communication with community, example settings etc can be planned with help from NGO's, local community leaders, school teachers, religious leaders, local medical personels and local private & government health centres to highlight the harmful ocular effects along with other health hazards of tobacco use and effective measures to be taken to prevent blindness/low vision in the community.

One small combined effort today can have a enormous impact over a period of time. Just as ripples spread out when a single pebble is dropped into water, the actions of individuals can have far reaching effects.

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