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Research Article

Prevalence of ocular morbidities and its correlates in an urban slum of central India

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Abstract: Globally 39 million are blind and 246 million have low vision and 80% of all visual impairment can be prevented, treated or cured. About 90% of the world's visually impaired people live in developing countries where ocular morbidities are major public health problem. The objective of the study was to estimate the Prevalence of ocular morbidities and its correlates in an urban slum of central India. The study was cross-sectional. It was performed in Shivankar Nagar slum, an urban field practice area of study institution. 525 study subjects were selected from total population of 3042 by simple random sampling. Information regarding socio-demographic characteristics of study subjects, eye complaints and examination were recorded in predesigned proforma. Data was analyzed using Epi - info 3.4.3 and STATA 10.1 statistical software.The prevalence of ocular morbidities in an urban slum of central India was 40.38%. The socio-demographic correlates like age, education, occupation, personal habits like smoking are significantly related with ocular morbidities. Prevalence of ocular morbidities was 40.38% and age, education, occupation, smoking are significantly related with ocular morbidities.
Keywords: Ocular morbidities, Cross sectional study.

INTRODUCTION

Eyes are most precious of our sense organs. About 285 million people are visually impaired worldwide. 39 million are blind and 246 million have low vision. 80% of all visual impairment can be prevented, treated or cured. About 90% of the world's visually impaired people live in developing countries where ocular morbidities are major public health problem [1].

The overall prevalence of ocular morbidities in India is reported to be high. It has been reported to vary from 20 to 90% in many studies [2-4]. An ocular morbid condition is defined as a condition in study subject, recognized or suspected, ocular or vision abnormality, which require treatment or surveillance [5]. Epidemiological factors like age, sex, socioeconomic status, smoking, alcohol consumption, chewing tobacco, exposure to cooking fuel etc. are associated with ocular morbid conditions [6].

In the developing countries, data on the prevalence of ocular morbidities are derived mainly from reports from institutions like blind homes, hospitals, school etc. Hence very little information is available on prevalence and socio-demographic correlates of ocular morbidities in the general population, especially in an urban slum.

MATERIAL AND METHODS

Present cross-sectional study was conducted in Shivankar nagar slum, an Urban field practice area of study institution to estimate the prevalence of ocular morbidities in an urban slum of central India and to study some socio-demographic correlates related with it. The duration of study was from September 2011 to October 2013 however data was collected from June 2012 to May 2013.

Sample Size

For sample size estimation study conducted by Dr Rajesh Gattani in 1995 in central India for studying prevalence of ocular morbidities was taken as reference. In this study prevalence was 42.3% [7]. So considering prevalence of 42.3% with 10% relative precision and 95% Confidence Interval estimated sample size was 524.

Approval from Institutional Ethics Committee was obtained. Shivankar Nagar slum was selected purposefully as it is urban field practice area of study institution. Middle most part of area was selected as landmark, the direction for selection of house was decided by rotating the pen. Number of houses existing in that row was given house numbers. First house was selected randomly by taking the last digit of currency note. All the family members in that house were selected as subjects then consecutive houses were selected in one specific direction. This direction was decided by tossing the coin right for tail and left for head. It was decided to pay 3 informed visits to include all the selected family members however after 3 informed consecutive visits at convenient time if some of the family member could not be contacted for examination then those should be excluded from the study; however none of the study subject was excluded as all family members were available for study. Thus 525 study subjects were selected from the total population of 3042.

Training for a period of 1 month was undertaken in the Department of Ophthalmology in study institution. Visits were paid to selected houses. The timing of the visit was adjusted to suit the convenience of study subjects and the investigator. Consent from the study subject was taken and in case of children below 12 years consents from parents were taken.

Information regarding socio-demographic characteristics like age, sex, education, income, occupation, etc were recorded in predesigned proforma. History of diminution of vision, night blindness, itching of eye, headache, eye strain, redness, watering, and use of spectacles, discharge from eyes, swelling of eyes, injuries to eye were recorded. In case of children below 12 years of age, information was obtained from parents.

The examination included torch light examination of eyelid, eyelashes, conjunctiva, sclera, cornea, pupil, iris and lens. The visual acuity of each study subject was tested by Landoldt's C ring chart above 6 years of age. In subjects with corrected refractive error visual acuity was tested with and without spectacle. Study subjects above 40 years of age were subjected to digital tonometry and near vision for presbyopia. Ishihara's chart was used for colour blindness in study subjects above 6 years of age. Subject for whom services of experienced Ophthalmologist was required were referred to Ophthalmology department of study institution.

Statistical Analysis

Descriptive statistics (percentage, mean, standard deviation, range); Data was analyzed using Epi - info 3.4.3 and STATA 10.1 statistical software.

RESULTS

Amongst 525 study subject, 212 were having ocular morbidities. Thus prevalence of ocular morbidities in this study was found to be 40.38% shown in Fig-1.

Table 1 shows prevalent ocular morbid conditions in study subjects as per ICD-10code. Presbyopia was most common ocular morbid conditions in study subjects responsible for 19.81% (104) of total ocular morbidities. Myopia was second most common i.e. 5.71% (30) followed by immature cataract 4.76% (25), Pterygium 2.85% (15), hypermetropia 2.67% (14). Prevalence of chalazion, exophthalmus, glaucoma and colour blindness was 0.19% each.

Table 2 shows multiple logistic regression analysis for risk factors of ocular morbidities -full model. For multivariate analysis, the factors which showed significance at $\dot{\alpha}$ = 20% in bivariate analysis were taken into consideration. A full model of multiple logistic regressions was prepared and individual effect of each risk factor was studied when all others factors were adjusted. The final model of multiple logistic regression was thus prepared by backward deletion of non-significant factors P > 0.05.The factors which were found to have significant association with risk of ocular morbidity in bivariate analysis at $\dot{\alpha}$ = 0.20, in decreasing order of strength of association were age occupational status and educational status.

Table 3.Shows multiple logistic regression analysis for risk factors of ocular morbidities –final model. On multivariate analysis smoking was having maximum risk of ocular morbidity with adjusted odds ratio (AOR) of 2.14, followed by educational status with AOR of 1.42. Other risk factors were occupational status and age with AOR of 1.40 and 1.14 respectively.

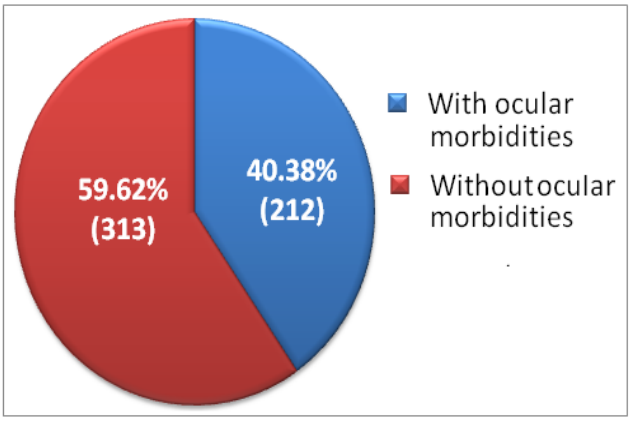

Fig-1: Prevalence of ocular morbidities among study subjects (n= 525)

Table 1: Prevalent Ocular Morbid Conditions in Study Subjects as Per ICD-10 Code

ICD-10 Code	Ocular Morbid conditions	Study subjects (n=525)	
		No.	%
H52.4	Presbyopia	104	19.81
H52.1	Myopia	30	5.71
H25.0	Immature cataract	25	4.76
H11.0	Pterygium	15	2.85
H52.0	Hypermetropia	14	2.67
S 05.0	Ocular injury	13	2.48
H18.4	Arcus senilis	10	1.90
H49.0	Strabismus	9	1.71
Z96.1	Pseudophakia	7	1.33
H40.0	Glaucoma suspect	7	1.33
H11.1	Pingecula	6	1.14
H17.0	Corneal Opacity	5	0.95
H54.4	Blindness (monoocular)	5	0.95
H15.1	Episcleritis	4	0.76
H00.0	Stye	3	0.57
H02.1	Ectropion	3	0.57
H02.4	Ptosis	3	0.57
H04.4	Dacrocystitis	3	0.57
H10.0	Conjunctivitis	3	0.57
H55	Nystagmus	3	0.57
H11.1	Conjunctival xerosis	3	0.57
H01.0	Blepharitis	2	0.38
H25.1	Mature cataract	2	0.38
H54.0	Blindness(Binocular)	2	0.38
H00.1	Chalazion	1	0.19
H05.2	Exopthalmos	1	0.19
H40	Glaucoma	1	0.19
H53.5	Colour blindness	1	0.19

Table 2: Multiple Logistic Regression Analysis for Risk Factors of Ocular Morbidities -Full Model

Risk factors	Adjusted Odds ratio (95% CI)	P value
Age	1.35 (1.10-1.15)	0.000
Educational status	1.40 (1.01-1.94)	0.039
Occupational status	1.40 (1.03-1.90)	0.030
No. of family members	0.84(0.50-0.93)	0.484
Alcohol consumption	1.16 (0.63-2.11)	0.633
Smoking	1.86 (0.93-3.71)	0.081
Smokeless Tobacco consumption	1.24 (0.90-1.73)	0.191

Table 3: Multiple Logistic Regression Analysis for Risk Factors of Ocular Morbidities –Final Model

Risk factors	Adjusted Odds ratio (95% CI)	P value
Age	1.14 (1.11-1.17)	0.000
Educational status	1.42(1.03-1.96)	0.030
Occupational status	1.40(1.04-1.90)	0.025
Smoking	2.14(1.14-4.00)	0.017

DISCUSSION

Ocular morbidities are responsible for partial or total blindness. About 30% of blind in India are said to lose their eye sight before they reach the age of 20 years and many under the age of 5 years [8]. Refractive errors, trachoma, conjunctivitis and vitamin A deficiency are the important causes of blindness among children and young age group [9, 10]. Cataract, refractive errors, glaucoma and diabetes are causes of blindness in middle age, accidents and injuries can occur in all age groups but more importantly in age group 20 to 40 years [11,12]. It is essential to detect these morbidities at the earliest to reduce the complications and disabilities, so that these patients have disability free life. Hence, the present study was carried out to cover all age groups and both genders.

In the present study, there were total 525 study subjects out of which 270 (51.43%) were males and 255 (48.57%) were females. In the present study subjects below 7 years of age were excluded for studying education status because, Census involves persons above 7 years for assessing literacy status [13, 14].

In the present study for occupational status subjects below 6 years of age were excluded as their occupational status cannot be ascertained even as student. In the present study maximum study subjects were unskilled workers 158 (32.11%) all were pursuing labour work. In the present study majority (76.38%) study subjects were from lower socio-economic status. This may be because the study was conducted in slum area where the occupations of most of the families were labourer, construction site worker, rickshaw puller etc. In the present study majority (76.38%) study subjects were from lower socio-economic status. This may be because the study was conducted in slum area where the occupations of most of the families were labourer, construction site worker, rickshaw puller etc.

In the present study maximum study subjects 114 (21.71%) were having habit of Smokeless Tobacco consumption followed by alcohol consumption 8.75% and smoking 5.71%. Also, it was noteworthy that 394 (75.05%) study subjects were having no habits. Smoking is associated with ocular morbid condition i.e cataract. Smoking causes morphologic and functional changes to the lens and retina due to its atherosclerotic and thrombotic effects on the ocular capillaries. Damage to the lens is related to any form of smoke and partially pyrolyzed organic materials from tobacco, some earlier studies suggests the major damaging mechanism to be oxidative stress brought about by reactive oxygen species (ROS) generated by smoke constituents both in dark and in light [15, 16].

In the present study, amongst 525 study subject, 212 (40.38%) were having ocular morbidities so, prevalence of ocular morbidities in this study was found to be 40.38%. Similar prevalence of ocular morbidities were observed by study done by Rajesh Gattani [7] (42.3%) and study done by Madhu Sharma *et al*. [2] (40%). However Deepika Agrawal *et al*. [6] reported the prevalence of ocular morbidity to be 53.0% and Gulati N [12] found prevalence of ocular morbidities to be 47.3 % which is higher than the present study.

In the present study prevalence of Presbyopia was most commom ocular morbidity (19.81%) which is a physiological condition and invariably occurs after the age of 40 years. It is similar to the finding reported by Dalvi S.D *et al*. [3] (24.2%), Arif Hussain *et al*. [17] (16.4%) and Zelalem Addisu Mehari [18] (15.4%). Decrease in the accommodative power of crystalline lens with increasing age, leading to presbyopia, occurs due to: Age-related changes in the lens which include decrease in the elasticity of lens capsule, and progressive increase in size and hardness (sclerosis) of lens substance which is less easily moulded and age related decline in ciliary muscle power may also contribute in causation of presbyopia [19-21].

In the present study, the prevalence of ocular morbidity was found to be significantly associated with age which is in agreement with the findings of the studies at Gulati N *et al*. [12], Titiyal JS *et al*. [22], Dandona L *et al*. [23] and Asole S *et al*. [24].

In the present study it was observed that as the age advances prevalence of ocular morbidities also increases. Similar finding were reported in studies conducted by Dandona R *et al*. [10] and Vaishali Shorte [25] however these studies were carried out in rural areas. In the present study prevalence of ocular morbidity was more in females 41.96% as compared to males 38.89% but this difference was not found to be significant. Deepika Agrawal *et al*. [6] reported that ocular morbidity was significantly higher ($P<0.01$) in females (56.2%) than males (49.1%).

In the present study it was observed that ocular morbidities were higher in low educational status subjects and illiterate as compared to higher educational status and literate and this difference was found to be statistically significant. Similar observations were found in various studies. In study conducted by Inaamul Haq *et al*. [26] prevalence of cataract was highest in illiterates. Ughade S.N *et al*. [27] reported that illiteracy was significantly associated with age related cataract. Nirmalan P.K. *et al*. [28] found that presenting blindness was associated with illiteracy.

In the present study prevalence of ocular morbidities were more in working group as compared to non working group. Ajaiyoeba A *et al*. [29] found that school children, farmers, welders and panel beaters were particularly at risk of ocular problems from injuries with potential for blindness. In the present study prevalence of ocular morbidities were more in unskilled workers. Similar finding were reported by Sing M.M *et al*. [30] they found that ocular disease were more prevalent among the landless labourers. In the present study prevalence of ocular morbidities were more in semiprofessional, Clerks, Shop Owners, and Farm Owners this finding was similar to finding reported by Deepika Agrawal *et al*. [6].

In the present study prevalence of ocular morbidities were more in Upper Middle Socioeconomic status as compared to lower socioeconomic status. Similar finding was observed by Wong T.Y *et al*. [31] in his study higher individual income was significantly associated with higher rates of myopia. However Prakash Prajapati *et al*. [9] reported that significant numbers of ocular morbidities were seen among lower socio-economic adolescents.

In the present study prevalence of ocular morbidity was more in study subjects having family members >5 as compared to study subjects having family members ≤5 and this difference was found to statistically significant. However prevalence of ocular morbidity was more in family with family members of 1 and 2. This may be because of more elderly persons in such families in whom ocular morbidities are common. Similar finding were reported by Rajesh Gattani [14] and Garg S *et al*. [32] in their study.

In the present study prevalence of ocular morbidity was more in study subjects having atleast one habit (viz.Tobacco consumption, alcohol consumption or smoking) as compared to study subjects with no habits and this difference was found to be statistically significant. Similar findings were reported by Rajesh Gattani [7] and Vaishali Shrote [25] in their studies. Sannapaneni K *et al*. [16] showed that cigarette smokers had a significantly higher prevalence of cataract compared with those who had never smoked ("never-smokers"). Similar finding was also observed by Krishnaiah S *et al*. [33] and Ughade SN *et al*. [27].

In the present study, after multivariate analysis smoking showed maximum risk of ocular morbidities followed by educational status, occupational status and age respectively. Krishnaiah S *et al*. [33] showed that the current smokers have two to three fold increased risk of cataract. Solberg Y *et al*. [34] observed that both cataract development and age related macular degeneration are directly accelerated by smoking, as cigarette smoking is highly irritating to conjunctival mucosa. Similar finding was observed by Sannapaneni K *et al*. [16].

Study has all the inherent limitations of a cross-sectional study e.g. inaccurate recall of information, limited possibility of determining causal relationship between epidemiological factors and ocular morbidities. Ophthalmoscopy, slit lamp examination, retinoscopy was not carried out therefore diseases of vitreous, iris, retina and optic nerve could not be studied.

CONCLUSIONS

The overall prevalence of ocular morbidities in urban slum is found to be 40.38%. The prevalence of ocular morbidities are found to increase with increasing age. The socio-demographic correlates like age, education, occupation, personal habits like smoking are significantly related with ocular morbidities. So periodic screening of population and early referral for diagnosis and specialized ophthalmic care is emphasized. Motivation and education regarding correction for presbyopia, refractive errors, and surgical correction of cataract should be regularly done.

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