Covariates on Vision Problems and their Relationship of Rajshahi Medical College Hospital (RMCH)

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Abstract

Vision is very important for all living being and the sharpness of vision may be affected due to various causes like scarcity of the proper vitamins, minerals, balanced food, age and some other related covariates. The objectives of the research was to identify the influencing covariates among the 21 assigned variables of 72 patients who were suffering from various eye related problems following authors' survey data using the purposive sampling technique. A throughout investigation and constructive analysis of the influential covariates have performed and the results are enlisted in result discussion section accordingly. As addition, history of vision problem and family history of diabetics, pathological examination, duration of diabetics and regularity in visiting doctors may have causal effect on vision problems we have given priorities on them. According to the pathological examination records only 4% patients depend on the HbA1c test, 22% on urine test and 74% on RBS test to know the diabetic status of the study area. Hypertension is one more risk factor having negative influences on the vision problem. This study shows about 39% of the patients have hypertension and rest 61% of the patients do not have hypertension. About 54% of the patients feeling that they are facing vision problem due to aged cause and rest 45% of the patients are feeling that they are facing vision problem due to diabetics. It is evident from the ophthalmic examination results that about 18% of the patients have normal vision and somewhat any deviation from normal vision have found for the rest 82% patients. The association between different covariates have been analysed following the Pearson's Chi-Square test statistic. The asymptotic significant relation of vision has been unearthed with controlling method of diabetics and duration of hypertension will help to the concerning agencies for policy implication in the consigned area.

Keywords: Vision problem; Ophthalmic examination; Hypertension; Diabetics; Covariates

Introduction

Vision is very important not only for a person but also for every living being. The clarity or sharpness of vision is named as the visual acuity and it is the amiability of the eye to see and distinguish fine details. The visual problems have been seen in all aged peoples especially in the peoples of poor countries due to the deficiency of proper food and nutrition. Because the people of these countries have to face some sort of scarcity of the proper vitamins and minerals even balanced food. As a result they may suffer from such kind of vision problems. Impairment in acuity is related with difficulties in physical function of the patients [1-3]. An estimate by the WHO suggested that 161 million person's world-wide have visual impairment including 37 million blind and 124 million with visual impairment less severe than blindness. But total number of persons with visual impairment of the world including uncorrected refractive error was estimated as 259 million 61% higher than commonly quoted WHO estimate. The number of persons in the world with visual impairment due to uncorrected refractive error could range from 82-117 million [4]. Based on WHO blindness in Singapore is 0.5%, Malaysia is 0.3%, Taiwan is 0.6%, Bangladesh is 1.5%, Indonesia is 2.2% and India is 4.3%. Besides these the emotional distress and low socialization [5,6] are considered as the part of quality of life. As such vision may depend on so many factors, we consider that factors as covariates. A good numbers of studies have been found in the

literature where the researchers have worked on the vision related problems both nationally and internationally. Among them Solan [7] investigated eye movement of Grade 6 children with reading disabilities by three comprehension therapies. They noticed comprehension therapy likewise produced improvement both in eye movement efficiency and in reading comprehension following the notion of a cognitive link among visual attention, oculomotor readiness, and reading comprehension. Maples [8] studied two interrelated factors race and socio-economic status on classroom performance influencing the visual skills. This study identified that inefficient visual skills impact the students' learning by a total of 2,659 examinations on 540 children were administered over three consecutive school years. Socio-economic, racial and standardized academic performance data (Iowa Test of Basic Skills–ITBS) have been used following the furnished of such data by the families and the school system. Lamoreux et al. [9] accomplished a study on basis of the Singapore Malay eye population to determine the prevalence and impact of visual impairment and major eye diseases in urban Asian populations. The authors identified the association between visual impairment and the main causes of vision loss, and falls. David et al. [10] worked on some common causes of vision problem and they reviewed the four most common causes of vision impairment in the elderly population as age-related macular degeneration, glaucoma, cataract and Diabetic Retinopathy (DR). A cross-sectional study was conducted by Marzieh [11] using the data of 40-80 years adults aged residing in Yazd district for the period of 2010-2011. They determined the prevalence and causes of blindness and visual impairment in their study. Resnikoff et al. [12] were estimated the prevalence of visual impairment caused by uncorrected refractive errors in 2004 on both regional and global stages for the people of aged 5 and over using contemporary published and unpublished surveys. They showed that based on the prevalence of visual acuity of less than 6/18 in the better eye with the currently available refractive correction that could be improved to equal to or better than 6/18 by refraction or pinhole. According to the National Eye Institute Visual Function Questionnaire (NEI-VFQ) decreases in scores is associated with vision loss due to the eye diseases like glaucoma, DR and cataract etc. [13,14]. Visual problems may happen due to the learning causes also for the young aged population [15]. Together with these some high risk factors can be considered as i) Obesity more than 120% desirable body weight or body mass index more than 25 kg/m², member of higher risk population (African, American, Hispanic, native American) and ii) Hypertensive people having blood pressure more than 140/90 mmHg.

Although in the aforesaid studies the researchers tried to investigate the vision problems in different practitioners viewpoints like ocular examination a question may arise what could be the allied variables may have joint or individual impacts on the vision oriented diseases have regarded as covariates in this research. However, the independent contributions of such covariates beyond vision problems have not been well characterized. As such inclusion of 21 more underlying variables could help to discriminate the covariates and identify the potential relationships among them according to the objectives of the research.

The covariates and risk factors

The covariates are the supporting variables that may influence the form of visualization positively or negatively. In this research we tried to identify the impact of possible covariates like Age, Sex, Marital status, Residence status, Religion, Height, Weight, Occupation, Income, Causes of vision problem, Diabetics status, Duration of diabetics, Treatment method of diabetics, Diabetic history of family members and Hypertension, Duration Diabetics and Hypertension, Regularity of visited by doctors on vision status and Taking any operation. Some socio-economic covariates have considered herewith.

Research Objectives

In this research we are very much concern to examine the related factors for vision problem. A set of related possible factors/variables have been listed to identify the covariates of vision problems. The objectives of this research are:

• To know the overall situation on vision problem for the selected area

• To identify the potential factors/covariates

• To measure the contribution of such covariates on vision problems.

Data collection Methods and Processing

Data collection is a mandatory part of conduction a research and proper method of collecting data may give the appropriate result of any research. The data in this research have collected from the Department of Ophthalmology (Both from indoor and outdoor) in Rajshahi Medical College Hospital (RMCH) for the period of 2nd September 2017 to 30 November 2017. As a non-probability sampling, the Purposive Sampling has used following a structured questionnaire and interview method. MS-Excel and SPSS for windows version 20 have used to process the data.

Results

As described in the objectives, the authors were intended to measure the covariates influencing the vision oriented problems and to find their relationship with the help of 21 variables on basis of authors' survey data. The assigned variables have been categorizes into three groups like health related, direct and indirect variables influential to the vision problems. A throughout and constructive analysis have employed and the result of all the analysis we are described step by step herewith. Both univariate and bivariate tables have prepared and the study included 39% male and rest 61% female patients. It is seen from the marital status that about 79% of the patients used in this research are married, 18% of the patients are unmarried and rest 61% of the patients are widowed. The religious status reported as 97% of the patients are comes from Muslim and 3% from Hindu community. The location status confirms that about 76% of the patients have comes from rural area while 24% of the patients are from urban areas. The occupational status of the patients can be a cause of the vision problem and the statistics shows that

there are about 47% of the patients are housewife, 15% of the patients are serviceman, 17% of the patients are farmer, 18% of the patients are businessman and 3% of the patients come from others occupation. We categories the patients income levels and it is noted that about 43% of the patients have income less than 5000 BDT, 14% of the patients have income from 5000 to 10000 BDT, 29% of the patients have income from 10000 to 15000 BDT and 14% of the patients have income above 15000 BDT.

We have been classified the age of the patients and it is found that about 7% of the patients are from the category less than age 40 years, about 29% patients are from the category 40 to 49 years, about 33% patients are from the category 50 to 59 years, about 19% patients are from the category 60 to 69 years and rest 11% patients are from the category greater than 70 years. Similarly the classified height demonstrated the maximum height of the patients 44.4% belongs to the group 140-150 with minimum of 1.4% belongs to the group 120-130. The maximum classified weight of the patients of 41.7% belongs to the group 50-59 with minimum of 19.4% belongs to the group 40-49. The BMI records shows that maximum 65.3% patients belongs to age group 25-30 while minimum patients are 1.4% in 35-40 age group. The addiction problem may cause the vision level of human being and we also try to demonstrate such level with the help of the collected information. It is observed that about 38% of the patients used in this research are smoking, 43% of the patients addicted to nicotine and rest 19% of the patients are non-addicted. About 25% of the patients are illiterate, 19% of the patients are able to give signature only, 22% of the patients are primary, 8% of the patients are JSC, 8% of the patients are SSC and 3% of the patients are graduate have been noticeable by the educational status of the patients.

We calculated the number of family members having diabetics and observed that about 22% of the patents' family members have diabetics, 14% of the patients' family members have not diabetics, the information of having diabetics or not of family members of 64% are not known. The detection history of diabetics shows that about 9% of the patients was detected diabetics by sudden test, 51% were detected while examining other disease and rest 40% were detected for examining the weakness and other problems. About 26% diabetic patients visited by doctor in regular, 52% are irregular in visiting doctor and 22% visited by doctor when problem arise. Among the diabetic patients 40% tried to control of diabetics and 60% were not serious about the controlling steps of diabetics. Hypertension is one more important causes having influences on the diabetic patients. These study notes that about 39% of the patients are suffering from hypertension and rest 61% have not hypertension. The duration of diabetics indicates that about 37% patients are suffering from diabetics for less than 5 months, 38% from 5 to 10 month, 21% from 10 to 20 month and rest 4% above 20 month. The duration of hypertension shows that about 3% patients have been suffering from hypertension for 2 years, 15% patients have been suffering from hypertension for 3 years, 17% patients have been suffering from hypertension for 5 years, 1% patients have been suffering from hypertension for 7 years, 4% patients have been suffering from hypertension for 3 years and rest 60% patients do not know that from when they are suffering from hypertension. Ophthalmic examination results

shows about 18% of the patients used in this research have normal vision and rest 82% of the patients have no normal vision.

The vision problem of diabetic family members of the patients has been investigated and it is found that about 25% of the diabetic family members have vision problem, 29% of the diabetic family members have not vision problem, the information of having vision problem or not of 46% diabetic family members is not known.

Table 1 revealed the types of test and controlling method of diabetics of the patients in this study. It is shown that about 22% patients depends on urine test, 74% Random Blood Sugar(RBS) test and rest 4% on HbA1c tablet for testing diabetics. The controlling statistics shows that about 8% of the patients depend on control food and exercise, 71% taking tablet and rest 21% on taking insulin for diabetics' treatment. The selected patients in this study shows that about 18% of the patients have normal vision and rest 82% of the patients do not have normal vision. Further among the vision problem patients 54% think that they are facing vision problem due to aged cause and rest 45% filling that they are facing vision problem due to diabetics.

The associations of different variables with Normal Vision have been analyzed and tested the Null Hypothesis, H0: There is no association between vision status and assigned variable using contingency table and the observed and expected frequencies are reported following the Pearson's Chi-Square test statistic as

$$\chi^2 = \sum \sum \frac{\left(f_{ij} - E_{ij}\right)^2}{E_{ij}} \sim \chi^2 (r-1)(c-1) \qquad (1)$$

Where, $(r-1)(c-1)$ is the df and f_{ij}=Observed Frequency and E_{ij}=Expected Frequency.

The results using equation (1) are enlisted in **Table 2**.

Table 1 Summary statistics on diabetics.

Test of checking Diabetics			
	Frequency	**Percent**	**Cumulative Percent**
Urine	16	22.2	22.2
RBS	53	73.6	95.8
HbA1c	3	4.2	100
Total	72	100	
Method followed for controlling Diabetics			
Food Control and Exercise	6	8.3	8.3
Tablet	51	70.8	79.2
Insulin	15	20.8	100
Total	72	100	

Table 2 The Chi-square test for associations of different covariates.

Relationship normal vision with	Value	df	Asyp. Sig. (2-sided)
Addiction	1.804	2	0.406
Educational status	5.007	5	0.415
Family members	0.998	2	0.607
Diabetics detection	0.04	2	0.98
Diabetics controlling method	12.832	2	0.002
Duration of hypertension	2.981	4	0.561
BMI	2.153	4	0.708

The asymptotic significant values together with the likelihood ratio statistics of different allied variables with normal vision status have been enlisted in **Table 2**. No association of variables Addiction, Educational Status, Family Members, Diabetics Detection technique, Method of Controlling Diabetics, Duration of Hypertension and BMI with Normal vision have been confirmed by the above results indicating that the tests are asymptotically insignificant. However, Linear-by-Linear Association of classified age and regularities of visited by Doctors (Chi-square=4.685; (p=0.030); 10.610(p=0.001)) show significant relationship of them with vision status have unearthed in this research.

Conclusion

In the current study we aimed to examine whether the influences of the covariates from the assigned variables has significant effect on the vision problems on basis of the authors' survey data. A throughout investigation and constructive analysis have been performed and that are comprised in the results section. The preliminary statistics of the selected variables have been reported in Results section accordingly. The pathological examination techniques of detecting diabetics of the patients are recorded and it indicates that about 22% of the patients follow urine test, 74% of the patients follow Random Blood Sugar (RBS) test and rest 4% of the patients follow HbA1c test. The method follows for diabetic treatment shows that about 8% of the patients control food and exercise, 71% of the patients take tablet and rest 21% of the patients take insulin for diabetics' treatment. In this research it is noted that about 39% of the patients have hypertension and rest 61% of the patients do not have hypertension. About 54% of the patients feeling that they are facing vision problem due to aged cause and rest 45% of the patients are feeling vision problem due to diabetics. The duration of hypertension shows that about 3% patients have been suffering from hypertension for 2 year, 15% patients have been suffering from hypertension for 3 year, 17% patients have been suffering from hypertension for 5 year, 1% patients have been suffering from hypertension for 7 year, 4% patients have been suffering from hypertension for 3 year and rest 60% patients do not know that when they suffering from hypertension. Ophthalmic examination results shows about 18% of the patients used in this research have normal vision and rest 82% of the patients do not have normal vision.

The asymptotic insignificant association of vision status to addiction category, Educational Status and Family Members have confirmed by the test. Similarly no association between Vision problem with detection methods of diabetics and type of physician visited are identified in this research. But the significant relation of association for the covariate vision problem with Age and regularities in visiting doctors have been discovered in this research. Therefore, it is reassuring that the covariates, Age and and regularities of visited by Doctors has significant impact to incongruity the vision problems of the patients could be the concern of the current research.

Limitations of the study

The establishment of more comprehensive models to ensure the aforesaid results for the eye specialist regardless of the selected covariates could eradicate one of the limitations of such study. To follow the research design in medical data is also one more limitation.

Acknowledgment

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