# PATTERN OF OCULAR DISEASES AMONG COMPUTER USERS IN ENUGU, NIGERIA

By

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**SUMMARY**:

**Objective:**
To determine the pattern of ocular disorders among computer users in Enugu.

**Methods**:
A cross-sectional survey of computer users was conducted in Enugu metropolis between August and December 2000. 560 subjects were selected by simple random sampling method. Examination methods include use of interviewer-administered structured questionnaire, visual acuity tests for distance and near, external eye examination, tonometry, direct ophthalmoscopy, retinoscopy and measurement of the distance between the operator and the computer.

**Result**:
A total of 354(63.2%) females and 206(36.8%) males were recruited for the study. Majority of the subjects (85.6%) were under 34 years of age. Two hundred and eleven (37.7%) out of five hundred and sixty subjects interviewed and examined had ocular disorders. Common ocular disorders seen include refractive errors (55%), presbyopia (16.6%), Pterygium (14.7%), conjunctivitis (6.6%). 7 subjects (1.3%) had monocular blindness with VA<3/60. 37 (3.3%) subjects had low vision with VA < 6/18-3/60.

**Conclusion**:
Most of the subjects were young people. Ocular disorders were encountered in computer users. Ocular health status of computer users can be improved through periodic ocular examination and health education.

***Keywords:*** *Ocular diseases, Computer users, Nigeria.*

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## INTRODUCTION

The world has become a global village and advanced information technology has contributed to this. Part of this advancement in information technology is the widespread increase in and use of computers (vdt) at home and in offices. It was estimated that more than 100 million workers in USA and Canada would have been using computers by the year 2000 [1] .The advanced countries have witnessed a steady increase in number and use of computers in the last 20 years. In Nigeria, this upsurge is evident in government, private and public offices as well as at homes. Banks, cyber cafés, multinational establishments, government offices and private companies are witnessing this digital revolution. Most companies nowadays require computer literacy as a prerequisite for employment. Consequently Nigerians, especially the young ones and even some older ones, are getting computer literate. The ultimate aim is to increase the pace of work in these offices as well as being an easier means of storage, processing and retrieval of large amounts of data.

Questions are being raised concerning the adverse health effects associated with computer use especially ocular health in advanced countries. In our environment, such questions are also being asked increasingly. Some have suggested that electrostatic charge (the stationary electric charge) found around computer (vdt) is responsible for the reported ill health of its operators[2] such as cataracts and conjunctivitis [1,3,4]. Others are of the opinion that the currents generated by the fields are significantly smaller than the currents in all the body tissue generated by biological activities [5]. Another school of thought posited that based on current evidence, it is unlikely that the use of computers causes permanent changes or damages to the eyes or the visual system[1,6].

In Enugu State, some patients that visit the eye clinic also complain of ocular problems such as blurring of vision which they attribute to the use of computers. Apart from the case control study done by Feyisayo[7] in Kwara State of Nigeria, on the effects of computer video display terminal on eye, no other study has been done any where in Nigeria to the best knowledge of the author.

The objective of the present study was to determine the pattern of the eye disorders seen in computer users and to provide relevant baseline data for the planning of eye care delivery services to the computer users.

## MATERIALS AND METHODS

A cross sectional survey of 560 randomly selected subjects in Enugu metropolis was recruited for the study between August and December 2002. To be eligible, subjects must have been working with computers regularly for at least four months and for not less than four hours daily. A list of companies from which the study population was taken was drawn from the directory of companies which was also updated by street to street listing of the eligible establishments. The survey was planned earlier with the relevant officers of the eligible companies. Data was collected on pre-tested, interviewer-administered questionnaire by trained assistants and the authors. Ethical clearance was obtained from the UNTH Enugu ethics committee. Distance and near visual acuities were measured with Snellen's and Jaegers charts respectively. Distance between the operator and the screen was measured using a metre tape. Anterior segment examination was done with pen torch and portable slit lamp. Posterior segment examination was done with a Keeler vista 20 standard direct ophthalmoscope. Tonometry was done using the Schiotz tonometer. Data collected were entered into computer and analysed using the Epi info version 6.0 statistical package.

## RESULTS

A total of 354 (63.2%) females and 206 (36.8%) males were recruited for the study. Majority of the subjects were under 34 years of age (table 1). Their mean age was 26.11 ±6.94 years while the median age was 25 years.

**Table 1**: Age/Sex distribution of 560 computer operators

| | SEX | | TOTAL | % |
|---|---|---|---|---|
| Age Group(Yrs) | Male | Female | | |
| < 20 | 13 | 36 | 49 | 8.8 |
| 20-24 | 67 | 160 | 227 | 40.6 |
| 25-29 | 49 | 94 | 143 | 25.5 |
| 30-34 | 36 | 24 | 60 | 10.7 |
| 35-39 | 19 | 22 | 41 | 7.3 |
| 40-44 | 15 | 12 | 27 | 4.8 |
| 45-49 | 6 | 3 | 9 | 1.6 |
| ≥ 50 | 1 | 3 | 4 | 0.7 |
| TOTAL | 206 | 354 | 560 | 100 |

The visual acuity in the 1120 eyes of 560 subjects is given in table 2. Of these 7 (1.3%) eyes were blind. Most subjects (96.4%) had good vision while only 20 had mild to moderate impairment. No subject was blind.

**Table 2:** Visual Acuity pattern of 1120 eyes of 560 subjects

| Visual Acuity | RE | LE | Total |
|---|---|---|---|
| 6/6-6/18 | 536 | 540 | 1076 |
| <6/18-6/60 | 15 | 13 | 28 |
| <6/60-3/60 | 5 | 4 | 9 |
| <3/60-1/60 | 2 | 3 | 5 |
| <1/60-PL | 1 | - | 1 |
| NPL | 1 | - | 1 |
| Total | 560 | 560 | 1120 |

Among the study subjects, 37.7% had ocular diseases while 62.3% had no discernible ocular diseases table 3. Refractive error was the most common disorder encountered.

**Table 3:** Distribution of ocular diseases among 560 computer users

| Ocular disease | Frequency | Percentage |
|---|---|---|
| Refractive error | 116 | 55.0 |
| Presbyopia | 35 | 16.6 |
| Pterygium | 31 | 14.7 |
| Conjunctivitis | 31 | 14.7 |
| Presumed toxoplasmosis scar | 3 | 1.4 |
| Glaucoma | 2 | 0.9 |
| Vitreous opacity | 2 | 0.9 |
| Chorioretinal pigmentary changes | 2 | 0.9 |
| Peripapillary scar | 1 | 0.5 |
| Cataract | 1 | 0.5 |
| Corneal scar | 1 | 0.5 |
| Uncorrected aphakia | 1 | 0.5 |
| Dermoid cyst | 1 | 0.5 |
| Total | 211 | 100 |

Various causes of monocular blindness are shown in table 4. Macular scar due to presumed toxoplasmosis was the commonest cause of blindness

**Table 4:** Causes of blindness among the 7 blind eyes

| Causes of blindness | Number of Eyes | Percentag |
|---|---|---|
| Presumed toxoplasmosis scar | 3 | 42.8 |
| Cataract | 1 | 14.3 |
| Glaucoma | 1 | 14.3 |
| Corneal scar | 1 | 14.3 |
| Uncorrected surgical aphakia | 1 | 14.3 |
| Total | 7 | 100 |

## DISCUSSION

The female to male ratio of the study population is 1.7:1.0. The greater number of females could be due to the fact that there are numerically more females than males in the state according to the 1991 population census report of Enugu state by National population commission [8]. A similar male to female ratio was found in a previous study[7]. Furthermore, females are generally more involved in secretarial and typing duties in our environment work.

Majority of the subjects were under 34 years. This is not surprising considering the fact that computer assisted work is relatively new in our environment and its application is attracting mostly unemployed young individuals with some form of computer literacy training, for employment especially in the commercial business centres. The pace of work in offices is documented to be faster with computers than with paper [1]

Although, no blindness was diagnosed in this study as a result of computer work, a good number of subjects had visual impairment. This is comparable to work done in Enugu on low vision by Umeh [9]. Most subjects of this study however had good vision. This is understandable because computer operators need good vision to operate their computers effectively.

Among the study subjects 37.7% had ocular disease. Refractive error was the most commonly encountered. Other population studies found refractive error to rank higher than any other ocular disease [10,11,12]. It appeared that the refractive problems seen had existed or that they were made manifest by the type of close, intensive and prolonged work with computers. Similar opinion was expressed by other workers [13,14]. It is suggested that pre-employment eye examinations will be helpful and any abnormality in ocular heath taken care of before computer use starts. Computers emit ultraviolet radiation and static charges [15]. Although static charges are not electromagnetic, they cause attraction and accumulation of dusts on computer screen which can lead to ocular irritation. Ultraviolet radiation and chronic ocular irritation, which are risk factors for pterygium and conjunctivitis, have been documented [16]. Pterygium and conjunctivitis were found in this study. It cannot be established by this cross-sectional study that computer use caused them. A prospective randomized clinical study rather than the present cross sectional study would be a better approach.

Macular scar due to presumed toxoplasmosis was the commonest cause of monocular blindness in this study instead of cataract and glaucoma seen in many population based studies. Cataract is the commonest cause of unilateral and bilateral blindness all over the world [17,18]. Increasing age is a risk factor for both conditions (cataract and glaucoma). Majority of this study population were under 34 years. This may also account for the relative absence of other age related blinding diseases in the study.

Zaret reported several cases of cataracts that he attributed to radiation effect from computers (vdt). His findings were however not substantiated by other workers [4]. In this study, computer users that had cataract already developed them before starting computer work.

**CONCLUSION:** Most subjects of this study were young individuals who mostly had good vision. The ocular disorders found among them were not specific to the use of computers. Regular ocular assessment and health education are advocated for persons that use computers for optimum visual function and health.

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