# Letter to the Editor
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## Computer vision syndrome in engineering students

**Corresponding Author:**

Name: Ashok Kumar M
Email: drmashok74@rediffmail.com

Dear Editor,

The use of computers has revolutionised office work but prolonged use of visual display terminals can result in ocular symptoms like eyestrain, tired eyes, irritation, burning sensation, redness, blurred vision and double vision, termed as "Computer Vision syndrome" (CVS).[1] But the problem of CVS is not fully appreciated in work places and even among ophthalmologists.[2] Hence the study was planned to evaluate CVS and the level of awareness regarding this problem in engineering college students who are going to be involved in this field for the rest of their career. Fourth year engineering college students were enrolled for the study. One hundred and fifty students with a mean age of 20.8 years in the computer science-based departments (Group A) who had computer usage of more than four hours per day and 120 students with a mean age of 20.75 years in non-computer science-based groups (Group B) were enrolled in the study. A questionnaire was used to assess the ocular symptoms (headache, tiredness of eyes, burning sensation, watering, double vision, and redness), the daily duration and number of years of computer use. For Group A an extra question regarding the ways to decrease computer-related eye strain was asked. Based on the presence or absence of four key words: proper lighting (if the subject answered about not using dim illumination or avoiding light focused on the monitor then it was taken as awareness regarding proper lighting); anti-glare filter; ergonomic position of monitor; and work breaks with frequent blinking. The awareness was graded as 0.25%, 50%, 75% and 100%. Near point of convergence (the point at which the straight line doubled) and near point of accommodation (the point at which the near vision chart blurred) were evaluated by Royal Air Force (RAF) ruler. Schirmer's test read at five minutes was used to assess the tear film status. Angle of gaze was evaluated as described by Izquierdo et al.[3]

Near Point of Convergence (NPC) tested by RAF ruler was 8.76 cm ± 3.93 in Group A and 7.25cm ± 1.74 in Group B with two tailed p value of 0.0001. Near Point of accommodation (NPA) was 7.62cm ± 1.85 in Group A and 6.97cm ±1.74 in Group B with two tailed p value of 0.0035. Schirmer's test at five minutes was 13.81mm ± 4.46 in Group A and 28.11mm ± 7.35 in Group B with two tailed p value of 0.000.

**Table 1: Comparison of symptoms between Group A and Group B**

| Symptoms | Group A (n=150) | Group B (n=120) | p value |
|---|---|---|---|
| Headache | 35 | 14 | 0.05 |
| Tiredness | 47 | 20 | 0.04 |
| Burning sensation | 38 | 10 | 0.00 |
| Watering | 36 | 6 | 0.00 |
| Redness | 19 | 0 | 0.00 |
| Double vision | 2 | 1 | 0.70 |

Statistical analysis done by Chi-square Test with Yates correction

**Table 2: Role of awareness in decreasing ocular symptoms (Group A)**

| Awareness | < 50% (n=77) | ≥ 50% (n=73) | p value |
|---|---|---|---|
| Headache | 35 | 0 | < 0.00 |
| Tiredness | 43 | 4 | < 0.00 |
| Burning sensation | 37 | 1 | < 0.00 |
| Watering | 33 | 3 | < 0.00 |
| Redness | 19 | 0 | 0.00 |
| Diplopia | 2 | 0 | 0.51 |

Statistical analysis done by Chi-square Test with Yates correction

Group A showed statistically significant higher incidence of ocular symptoms (Table 1). Study of awareness of computer-related symptoms in Group A showed less than 50% awareness was found in 77 students and more than 50% awareness in 73 students. Those with awareness >50% were found to have statistically significant lowering of ocular symptoms (Table 2). In Group A students 67 had Angle of Gaze less than 14 degrees and 83 had more than 14 degrees. Those with angle of gaze less than 14 degrees were found to have statistically significant lowering of ocular symptoms (Table 3).

**Table 3: Effect of angle of gaze on ocular symptoms in computer science group students (Group A)**

| Angle of gaze | < 14 degrees (n=67) | >14 degrees (n=83) | P value |
|---|---|---|---|
| Headache | 35 | 0 | <0.00 |
| Tiredness | 42 | 5 | <0.00 |
| Burning sensation | 37 | 1 | <0.00 |
| Watering | 33 | 3 | <0.00 |
| Redness | 19 | 0 | <0.00 |
| Diplopia | 2 | 0 | 0.39 |

Yee et al showed dysfunctional tear syndrome using ocular surface disease index in long-term computer use and use of microenvironment glasses and lubricating eye drops alleviated the symptoms.[4] In our study the Schirmer's test at five minutes showed a statistically significant lowering of tear secretion in Group A with increase in symptoms related to dysfunctional tear film such as redness, irritation and watering. Prolonged use of visual display terminals has been shown to cause convergence insufficiency and diminished power of accommodation.[1] In our study significant removal of both the NPC and NPA was found in computer science-based students in comparison to non-computer users with increased occurrence of asthenopic symptoms like tiredness and headache. Izquierdo et al showed that angle of gaze of more than 14 degrees caused a decrease in eye pain associated with prolonged computer use.[3] In our study also angle of gaze ranging from 14 to 22 degrees resulted in a significant decrease in ocular symptoms compared to angle of gaze of 1.7 to 11.3 degrees.

Our study has shown a significant alteration and dysfunction in accommodation, vergence and tear secretion. In our study more than 50% (77 students) in the computer science group had significant lack of awareness regarding CVS and the ocular symptoms were significantly worse in this subgroup of computer science based students. Health education (preferably to be included in the routine curriculum) including alternative forms of medicine like yoga[5] to increase awareness should be tried to improve visual discomfort in computer science based students.

Sincerely,

Ashok Kumar M, Shanmugapriya R

Department of Ophthalmology
Mahatma Gandhi Medical College and Research Institute, Puducherry, India

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# Supervised nutritional intervention for malnourished children under six of migratory workers at Dr. Padmashree Vithalrao Vikhe Patil Cooperative Sugar Factory, Maharashtra, India

**Corresponding Author:**

Dr.Kamble Suchit V.
Email: drsuchit@rediffmail.com

Dear Editor,

Seasonal migration of agricultural labourer from drought-prone areas to prosperous agricultural belts is common in rural areas. The poverty, ignorance, lack of health services make the children at migration site more vulnerable to a variety of diseases and undernourished.

Undernourished children have lower resistance to infection and are more likely to die of common childhood illnesses such as diarrhoea and lower respiratory-tract infections. The malnourished children from migratory families have to be screened and supported by supplementary food, adequate in quantity and rich in quality.

Therefore the present study was conducted among children under six of migratory sugarcane workers to study their nutritional status. This study evaluated the impact of observing the supplementary nutritional services for malnourished children by involving college youths.

Hut-to-hut survey was done by social workers and final year medical students of Rural Medical College, Loni,Maharashtra at the migration site of Dr. Padmashree Vithalrao Vikhe Patil Cooperative Sugar Factory, Pravaranagar district Ahmednagar, India. All children below six years of age were identified and enrolled for the study. A total of 200 children were enrolled in the study. According to the nutritional subcommittee of Indian Association of Paediatrics (IAP) 1972 classification[1]; all children were categorised into various grades of Protein Energy Malnutrition (PEM).

Out of the total of 200 enrolled children, 89 were malnourished. Nutritional intervention was done for the malnourished children in the form of nutritional education to mother or care taker, nutritional supplementation and hospital care for grade four malnourished children.[2] The main goal of nutritional education was to provide adequate calories for dual purpose to replace losses and to build up nutrition and promote growth. The energy recommended was 120-150 kcal/kg body weight/day and protein 2-3 gm/kg body weight/day of high biological value.[2] For grade three malnourished children additional nutritional supplements were given daily. Nutritional supplements given to grade three malnourished children constituted of 3:2 ratio of rice and green gram for three months every day. Grade four cases were referred to Pravara Rural Hospital for further management.

The responsibility of supervising these malnourished children were given to final year medical students, a maximum of four such children were allotted to each medical student. These students were made accountable to have weekly follow-up visit to the houses of malnourished children. During these visits, students distributed supplementary food for one week to grade three malnourished children and ensured the consummation of these supplementary foods given one week prior so nutrition education was also given to the mother concerned.

After three months of intervention, the weight of all malnourished children was taken and according to IAP classification they were categorised into various grades of malnutrition.

Overall the prevalence of PEM was 44.5% (89/200) in study subjects. The prevalence of grade 1 PEM was 26%, grade 2 PEM was 13%, and grade 3 PEM was 5.5 %. The mean weight of malnourished children before and after the intervention is shown in Tables 1 and 2. Age-wise grades malnutrition after intervention is shown in Table 3.

**Table 1: Age wise and grade wise mean weight of PEM children before the intervention:**

| Age in years | Mean weight in Kg | | | Total (mean weight kg) |
|---|---|---|---|---|
| | Grade I PEM | Grade II PEM | Grade III PEM | |
| 0-1 yrs | 5.25 | 0 | 0 | 5.25 |
| 1-2 yrs | 7.5 | 6.6 | 5.7 | 6.86 |
| 2-3 yrs | 9 | 8 | 6.9 | 8.38 |
| 3-4 yrs | 10.47 | 8.8 | 7.9 | 9.63 |
| 4-5 yrs | 11.10 | 10 | 8.7 | 10.62 |
| 5-6 yrs | 12.2 | 10.7 | 9.6 | 11.4 |
| Total | 10.15 | 9.03 | 7.3 | 9.46 |

**Table 2: Age wise mean weight of PEM children before and after intervention:**

| Age in years(number) | Mean weight before intervention | Mean weight after intervention | T value | P value |
|---|---|---|---|---|
| 0-1 yrs(1) | 5.25 | 5.61 | - | - |
| 1-2 yrs(14) | 6.86(1.3) | 7.26(1.5) | 0.696 | Non significant |
| 2-3 yrs(18) | 8.38(1.2) | 10.8(1.5) | 5.34 | Highly significant |
| 3-4 yrs(19) | 9.63(1.1) | 10.2(1.2) | 1.52 | |
| 4-5 yrs(19) | 10.62(0.8) | 11.2(1.1) | 1.87 | |
| 5-6 yrs(18) | 11.4 (0.8) | 12.3(1.0) | T=3 | Highly significant |
| Total | 9.46(1.4) | 10.4(1.5) | Z =4.3 | Highly significant |

**Table 3: Age wise grades of PEM after intervention:**

| Age in years | Normal | Grade I PEM | Grade II PEM | Grade III PEM | Total |
|---|---|---|---|---|---|
| 0-1 yrs | 1 | 0 | | 0 | 1 |
| 1-2 yrs | 5 | 5 | 3 | 1 | 14 |
| 2-3 yrs | 7 | 6 | 4 | 1 | 18 |
| 3-4 yrs | 9 | 6 | 3 | 1 | 19 |
| 4-5 yrs | 8 | 7 | 4 | 0 | 19 |
| 5-6 yrs | 8 | 7 | 3 | 0 | 18 |
| Total | 38 | 31 | 17 | 3 | 89 |

This study found a prevalence of malnutrition among young children from migrant worker families similar to that reported by National Family Health Survey (NFHS)-3 of India. The results of our study showed that the nutritional status of children in all grades improved in their home environment in a relatively short period of three months.

Kavita Parikh et al[3] compared acute and chronic undernutrition rates before and after the introduction of a food-supplementation program as an adjunct to routine health care for children of migrant workers in the Dominican Republic. The author reported that there was a decrease in the percentage of children categorised as mild (33% versus 20%, *P* = 0.004) and moderate acute undernutrition (7% versus 3%, *P* = 0.004) between baseline and post-intervention.[3]

In the present study the weekly supervised nutritional supplementation and biweekly nutritional education to mothers showed the corresponding improvement in the growth of children. It also helped to maintain the sustainability of behavioural changes in mothers regarding feeding and cooking practices. Therefore it is recommended that this supervised nutritional interventional can be implemented at every migration site. Malnutrition among children under six can be corrected during the stay of these workers at migrated village or town within short period of time.

Sincerely,

Dr. Suchit V. Kamble[1]
Dr. Girish B Dhumale.[2]
Dr. Yugandhara D.Ghodke[3]
Dr. Ramchandra C Goyal[4]

Affiliation(s).
1. Department of Community Medicine, K.V.G. Medical College, Sullia, Karnataka State, India.
2. Department of Community Medicine, Bharati Vidyapeeth Medical College, Sangli, MH,India.
3. Department of Pharmacology .V.G. Medical College, Sullia, Karnataka State, India.
4. Department of Community Medicine, J.N.Medical College, Wardha, India

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