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Visual problems among video display terminal (VDT) users in Nepal

Gauri Shankar Shrestha[a,*], Fathimath Nestha Mohamed[b], Dev Narayan Shah[a]

[a]*B.P. Koirala Lions Centre for Ophthalmic Studies, Institute of Medicine, Tribhuvan University. Maharajgunj, Kathmandu, Nepal*
[b]*Indira Gandhi Memorial Hospital, Male' Health Services Coorporation Limited Male', Republic of Maldives*

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KEYWORDS
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Abstract
Purpose: To evaluate visual problems, major symptoms, and their associations among VDT users in Nepal.
Methods: Among 76 hospital attendees, assessment included visual acuity, retinoscopy, convergence, accommodation, fusional vergence and Schirmer's II. Subjects' symptoms were recorded in the structured 5 point intensity scale questionnaire.
Results: Mean age of subjects was 25.8 ± 5 years with 6.9 ± 2.6 hours/day of computer use. Ocular changes were reported in 92.1% of the total subjects. The common ocular change was accommodative infacility. The most common symptoms ($p < 0.001$) were tired eye and headache. Reduced tear secretion as indicated by Schirmer's test II was found to have a little role in manifesting the symptoms as indicated by regression coefficient.
Conclusions: Accommodative infacility and tired eye were the most common abnormalities and symptom reported. Schirmer's test II was slightly correlated with some ocular, visual, and systemic symptoms.

PALABRAS CLAVE
VDT;
Síntomas;
Cambios oculares;
Nepal

Problemas visuales en usuarios de terminales de visualización de vídeo (VDT) en Nepal

Resumen
Objetivo: evaluar los problemas visuales, los síntomas principales y sus asociaciones en usuarios de VDT en Nepal.
Métodos: se realizaron evaluaciones en 76 pacientes del hospital que incluyeron agudeza visual, retinoscopia, convergencia, acomodación, convergencia de fusión y la prueba de Schirmer II. Los síntomas de los sujetos se registraron en el cuestionario estructurado con una escala de intensidad de 5 puntos.

*Corresponding author. B.P. Koirala Lions Centre for Ophthalmic Studies, Maharajgunj, Kathmandu. P.O. Box no 8750.
E-mail address: gs101lg@hotmail.com (G. Shankar Shrestha).

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Resultados: la media de edad de los sujetos fue de 25,8 ± 5 años con una media de uso del ordenador de 6,9 ± 2,6 horas/día. Se notificaron cambios oculares en el 92,1%del total de los sujetos. Un cambio ocular frecuente fue la dificultad de acomodación. Los síntomas más frecuentes ($p < 0,001$) fueron fatiga visual y cefalea. Se descubrió que la reducción de la secreción lagrimal, según lo indicado por la prueba de Schirmer II, tiene una función insignificante en la manifestación de los síntomas, tal como mostró el coeficiente de regresión.
Conclusiones: la dificultad de acomodación y la fatiga visual fueron las anomalías y síntomas notificados con más frecuencia. La prueba de Schirmer II se correlacionó ligeramente con algunos síntomas oculares, visuales y sistémicos.

Introduction

The Video Display Terminals (VDTs) are becoming commonplace items today. Many individuals who work with a computer experience eye-related discomforts or visual problems.[1-3] However, it is unclear whether these problems occurs to a greater extent in computer workers than in workers in other highly visually demanding occupations.[1] Yeow (1989 and 1991) reported that VDT work didn't have a significantly greater effect on visual function. Vision problem in VDT users were generally temporary.[4,5]

Apart from the computer usage, ergonomics of furniture used, source of glare, temperature, humidity, location of VDU, job related task, environmental factors and defect of vision are essential to avoid computer vision syndrome.[2,6-8]

Use of VDTs is on the rise to Nepalese work places owing to growing trend towards office computerization. This study was conducted to determine the causes of ocular abnormalities; identify the major ocular, visual, and systemic symptoms; and find out their associations among VDT users in hospital attendees in Nepal.

Methods

Study design and subjects

Initial 76 subjects, who visited to B.P. Koirala Lions Centre for Ophthalmic studies (BPKLCOS), Institute of medicine, were enrolled in the study from February 2009 to July, 2009. It included 18 (23.7%) students (bachelor and master level), 14 (18.4%) computer operators (software engineers, wave designers, and data analysts), 20 (26.3%) office workers (clerical staffs, administrative officers, secretaries, receptionists, and project officers), 11 (14.5%) bank workers (cashiers, accountants, and bank clerks) and 13 (17.1%) others (teachers, tour operators, and photographers). The purpose of the study was clearly explained and verbal consent was taken from each subject. Subjects were enrolled in the study on the basis that they worked on computer for minimum of two hours per day (Table 1). Subjects with best corrected vision less than 6/9 (20/30), presbyopia, ocular pathology, strabismus, contact lens wearers and unwilling to participate in the study were excluded from the study.

Table 1 Description of participants, and ocular abnormalities

SN		Particulars
1	Gender	
	Male	53 (69.7%)
	Female	23 (30.3%)
2	Age ± SD	25.8 ± 5 years
3	Average duration of computer use	6.9 ± 2.6 hours per day
	Students (n = 18)	5.1 ± 2 hours/day
	Computer operators (n = 14)	8.7 ± 2.9 hours/day
	Office workers (n = 20)	7.2 ± 2.1 hours/day
	Bank workers (n = 11)	6.8 ± 2.4 hours/day
	Others (n = 13)	6.9 ± 2.3 hours/day
4	Average change in spherical equivalent (n = 25)	−0.6 ± 0.2 (Range Max −0.5 D and Min −1.25 D)
5	Distant exophoria (≥ 4 pd)	10 subjects (13.2%)
6	Near exophoria (≥ 6 pd)	12 subjects (15.8%)
7	Category of ocular abnormalities	
	CI	14 (9%)
	AI	15 (9.7%)
	AF	55(35.5%)
	LAG	21 (13.6%)
	Dry eye	11 (7.1%)
	FI	23 (14.8%)
	Refractive error	16 (10.3%)
	Total	155 (100%)*

AF: accommodative infacility; AI: accommodative insufficiency; CI: convergent insufficiency; FI: fusional insufficiency; LAG: lag of accommodation; SD: standard deviation.
*Cumulative score of ocular abnormalities present.

Assessment

The assessment involved structured questionnaire concerning subjective symptoms and determination of the ophthalmologic routine status. The questionnaire was collected and the eye examination was conducted the same day by an ophthalmologist and an optometrist. Complete

medical history was recorded to exclude any systemic disease, ocular disease or use of medication.

Visual acuity: Monocular visual acuity was measured and recorded with an internally illuminated Snellen chart at distance of 6m under normal lighting condition. Near visual acuity was measured at 35-40 cm.

Ophthalmic examination

All subjects underwent a complete ophthalmic examination of anterior segment with slit lamp and posterior segment with direct ophthalmoscopy. Indirect binocular ophthalmoscopy was carried out after dilatation with tropicamide 0.5% eye drop when it was found necessary.

Refraction

Static and subjective refraction were carried out in every subject. A change or presence in spherical equivalent refractive error equal to or greater than ± 0.50 D was considered significant. Dynamic retinoscopy was carried out at 35-40 cm by monocular estimation method. Normal lag of accommodation was considered as + 0.75 D.

Cover test

Ocular alignment was assessed by means of cover test at six meter distance and at 40 cm distance. No movement on cover test was considered as orthophoria. Exophoria was considered significant when outward latent deviation exceeded four prism diopters at distance and six prism diopters at near. Esophoria was considered significant when inward deviation exceeded two prism diopters at distance and four prism diopters at near.

Positive fusional vergence

Vergence amplitude was measured at 40 cm and 6 m with the help of horizontal prism bars placing base out before subject's one eye and increasing power of prism gradually unless subject noticed first blur, break and recovery. Morgan's norm was considered as normal score for near (17/21/11) and distance (9/19/10) fusional vergence.

Near point of convergence

Near pint of convergence was measured with Royal Air Force rule at primary gaze by moving the single dot target on the rule along the scale towards the eye. Convergence of less than 10 cm was considered normal, 11-15 cm reduced and ≥ 15 cm was defective.

Amplitude of accommodation

Amplitude of accommodation was measured on Royal Air Force rule with N6 target letter. The print was then moved towards the subject until the letters became illegible. Normal value of amplitude of accommodation was calculated by the Hofsetters formula [Amplitude of accommodation = 16-(Age/4)].

Accommodative facility

Accommodative facility was measured with ± 2.0 D binocular flipper lens at 40 cm distance viewing target letter size equivalent to N8. The diagnostic criterion was set at 10 cycles per minute binocularly. Below this score was considered abnormal.

Schirmer's test II

Schirmer's test II was carried out to calibrate amount of basic tear secretion using Whatman-41 filter paper 5 minutes after instillation of 2% lidocaine eye drop. Wetting scale of less than 10 mm in 5 minutes was considered abnormal.

Structured questionnaire

Structured questionnaire included four sections concerning duration of computer use, intensity of ocular symptom (watery, feeling of dryness, itching, Pain behind eye, Aching, soreness, and tiredness), visual symptom (Blurred vision and Doubled vision), and systemic symptom (Shoulder pain, Neck pain, Back pain, and Headache). The symptom scores were ranked on intensity rating as 0 = none or asymptomatic, 1 = very mild, 2 = mild, 3 = moderate, 4 = intense, and 5 = very intense. The subjects were asked to state the occurrence of symptom and specify the hours at which they did VDT work, performed other work, or took breaks. Symptoms were entered in to statistical analysis using this intensity rating scale. Questionnaire is available in Appendix I.

Statistical analysis

All data were evaluated using statistical tools in statistical package for social science (SPSS version 14). Variance of age and duration of computer use was analysed for sexes using unpaired t-test. Ocular abnormalities and symptoms were analyzed using non-parametric test using Mann-Whitney U test for two different unmatched subject groups and Kruskal Wallis test for three or more unmatched subject groups. Chi-Square test was performed to assess correlation between symptoms with ocular abnormalities and gender differences. Multiple regression analysis was also used to assess the correlation between each dependent variable (ocular symptoms, visual symptoms, and systemic symptoms) and independent variables (duration of computer use in hours per day, accommodative abnormalities, convergence abnormality, fusional insufficiency, and reduced tear secretion). Independent variables were selected for each dependent variable by "enter" variable selection method. Confidence interval was considered at 95% level. P-value was considered significant for less than 0.05.

Results

Demographic profile of subjects, and ocular abnormalities

A total of 76 subjects were enrolled in the study (Table 1). Mean age of the subjects was 25.8 ± 5 years (male 26.6 ± 5 years and female 24.3 ± 4.4 years). Male constituted 53 subjects

(69.7%) and female constituted 23 subjects (30.3%). Twenty office workers (26.3%) and 18 students (23.8%) visited mostly for eye examination. Average computer working hour per day was 6.9 ± 2.6. Computer operators (14 subjects, 18.4%) worked mostly on computers (8.7 ± 2.9 hours/day) followed by office worker (7.2 ± 2.1 hours/day), and the least computer users were the students (5.1 ± 2 hours/day). Distance and near exophoria was found in 10 subjects (13.2%) and 12 subjects (15.8%) respectively.

Seventy subjects (92.1%) had some form of ocular abnormalities. Thirty three subjects (43.4%) had at least two abnormalities present. One ocular abnormality was present in 15 subjects (19.8%), two abnormalities in 14 subjects (18.4%) and four abnormalities in 8 subjects (10.5%).

Out of 30 existing spectacle wearers (39.4%), significant change in spherical equivalent was found in 2 subjects (2.6%). Another 14 subjects had spherical equivalent refractive error greater than ± 0.5 D. Average change in spherical equivalent refractive error was —0.6 ± 0.2 D. Nine subjects had bilateral and seven subjects had unilateral changes in refractive error. Refractive error was the only abnormality observed in one subject.

Accommodative infacility (35.5%) was the most common abnormality diagnosed followed by fusional insufficiency (14.8%) and lag of accommodation (13.6%). Both the sexes were equally affected for all these abnormalities (Table 1).

Distribution of symptom scores in subjects

All subjects had some form of ocular, visual and systemic symptoms (Table 2). The three most commonly reported symptoms were tired eye (n = 67; total score 12.5%; Median, 2), headache (n = 65; total score 13.3%; Median 3), and sore eye (n = 54; total score 8.6%; Median 2). The least reported ocular symptom was doubled vision (n = 9, total score 1.2%, Median 2). Ocular symptom scores (Kruskal-Wallis test, p = 0.019) and systemic symptom scores (Kruskal-Wallis test p = 0.006) were significantly different within the groups. But visual symptom scores (Mann-Whitney test p = 0.09) was insignificant. Symptom scores were also different among all the groups (Kruskal-Wallis test p = 0.005). All the symptoms were particularly insignificant between male and female.

Multiple regression analysis between symptoms and ocular findings

Table 3 contains the standard regression coefficients and adjusted R^2 value of multiple regression analysis. For all symptoms, the independent variables selected by the enter selection method included all the ocular abnormalities and duration of computer work in hours per day. Adjusted R^2 value for pain behind eye ($p < 0.01$), aching eye ($p = 0.02$), and double vision ($p = 0.02$) were 0.3, 0.1, and 0.1 respectively. Regression coefficient of ocular findings showed sporadic and minor influence on symptoms. However, abnormal Schirmer's test II was found to be a relative predictive factor to cause some form of the symptoms like pain behind eye ($\beta = 0.5$, $p < 0.01$), aching eye ($\beta = 0.4$, $p < 0.01$), total ocular symptoms ($\beta = 0.3$, $p = 0.03$), double vision ($\beta = 0.3$, $p = 0.01$), neck pain ($\beta = 0.3$, $p = 0.04$), and total symptoms ($\beta = 0.3$, $p < 0.01$).

Discussion

This study reported the ocular abnormalities detected in computer users, and identified the major ocular, visual, and systemic symptoms in hospital attendees in Nepal. However, correlation between these abnormalities and symptoms was not so significant.

Table 2 Distribution of symptom scores

SN	Symptoms	Symptom reported for at least once	Total scores	Percentage symptom score	M	Gender difference (Chi square test)
Ocular symptoms						
1	Watery eye	59.2%	88	6.7	3	$\chi^2 = 6.3$, df = 3, p = 0.09
2	Dry eye	61.8%	105	8.1	2	$\chi^2 = 4.7$, df = 4, p = 0.31
3	Itchy eye	48.7%	63	4.9	1	$\chi^2 = 2.7$, df = 3, p = 0.44
4	Pain behind eye	42.1%	66	5.1	2	$\chi^2 = 2.9$, df = 3, p = 0.4
5	Aching eye	61.8%	101	7.8	2	$\chi^2 = 2.9$, df = 4, p = 0.56
6	Sore eye	71.1%	112	8.6	2	$\chi^2 = 3.7$, df = 3, p = 0.29
7	Tired eye	88.2%	163	12.5	2	$\chi^2 = 11.54$, df = 4, p = 0.02
A. Visual symptoms						
1	Blurred vision	64.5%	107	8.4	2	$\chi^2 2 = 1.6$, df = 3, p = 0.66
2	Double vision	11.8%	16	1.2	2	$\chi^2 = 1.76$, df = 2, p = 0.41
Systemic symptom						
1	Shoulder pain	51.3%	86	6.6	2	$\chi^2 = 5.73$, df = 3, p = 0.12
2	Neck pain	67.1%	109	8.2	2	$\chi 2 = 5.24$, df = 3, p = 0.15
3	Back pain	61.8%	112	8.6	2	$\chi^2 = 0.28$, df = 3, p = 0.96
4	Headache	85.5%	173	13.3	3	$\chi^2 = 4.14$, df = 4, p = 0.38

M: median; confidential interval 95%; p: Value significant at level of 0.05.
Kruskal-Wallis test (ocular symptoms, p = 0.012; systemic symptoms, p = 0.006).
Mann-Whitney test (visual symptoms, p = 0.09).

Table 3 Standard regression coefficient and Adjusted R^2 Value in Multiple Regression Analysis

Dependent variable	Independent variable (regression coefficient)								Adjusted R^2
	CI	AI	AF	LAG	Dry eye	GI	Refractive error	DCW	
Watering	−0.5	0.15	−0.2	0.2[a]	−0.1	−0.02	−0.05	0.2	0
Dry eye	−0.2	2.2	0.6	−1.4	0.4	0.4	−1.77	0.4	0.05
Itchy eye	0.1	−0.1	−0.03	−0.04	0.2	−0.2	0.2	0.05	0.02
Pain behind eye	0.04	−0.2[a]	0.1	0.1	0.5[b]	−0.1	−0.2	0	0.3[b]
Aching eye	0.1	−0.1	0.1	0.3[a]	0.4[b]	−0.1	−0.02	−0.05	0.1[a]
Sore eye	0.02	0	−0	−0.1	0.02	−0.06	0.1	−0.05	−0.1
Tired eye	−0.1	0	0.05	−0.03	0.2	0	−0.1	−0	−0.04
Total ocular symptoms	−0.03	−0	0	0	0.3[a]	−0.1	−0.1	0.05	0.03
Blurred vision	−0.03	−0.2	−0.1	0.1	0.08	−0.1	−0	−0.03	−0.04
Double vision	−0	−0.2	0.2	0.2	0.3[b]	−0.1	−0.03	0	0.1[a]
Total visual symptom	−0.03	−0.2	−0.03	0.1	0.2	−0.1	−0.01	−0.03	0
Shoulder pain	0.1	−0.01	0.2	0.04	0.2	0.1	−0.2	−0.2	0.03
Neck pain	0.02	0.04	0.2	0.04	0.3[a]	0	−0.1	0	0.06
Back pain	0.2	0.1	0.1	0.01	0.1	0.04	−0.1	0.01	0
Headache	0.1	0.1	0.02	−0.1	0	0.2	−0.1	−0.1	−0.05
Total systemic symptoms	0.2	0.1	0.2	−0.01	0.2	0.1	−0.2	−0.1	0.05
Total symptoms	0.04	−0.02	0.1	0.02	0.3[b]	−0.01	−0.1	−0.01	0.03

[a]Less than 0.05.
[b]Less than 0.01.
AF: accommodative infacility; AI: accommodative insufficiency; CI: convergence insufficiency; DCW: duration of computer work use in hours per day; FI: fusional insufficiency; LAG: lag of accommodation.

Ocular abnormalities were seen in 92.1%(Table 1). The three commonest ocular abnormalities were accommodative infacility in 35.5%, fusional insufficiency in 14.8%, and lag of accommodation in 13.6%. The higher incidence of abnormality was not unexpected because the subjects, who visited to hospital seeking eye and vision care, were enrolled in the study.

Symptoms in VDT users were vague and reported different in different literatures. The ocular complaints experienced by computer users typically include eyestrain, eye fatigue, burning sensations, irritation, redness, blurred vision, and dry eyes. Non-ocular symptoms include headaches, pain in the shoulders, neck, or back.[9] However, eye related symptoms were reported as the most common health problem among VDT users.[10-13]

Edema[14] reported tired eye (62.5%), blurred vision (59.4%) and itching (59.4%) were the three major subsequent symptoms reported in spectacle wearer than non wearer. In another study, eye strain (91%), painful or stiff neck and shoulder (81%), and burning eyes and irritability (80%) were the symptoms frequently reported.[2] Headache (41.78%), eyestrain (26.72%), pain (31.51%) and lacrimation (19.86%) were the most prevalent visual symptoms among non-presbyopic VDT users.[15] We have found the tired eye was the most common symptom reported by 88.2%(Table 2). Headache was the most intense symptom represented by 13.3%of total symptom score. These symptoms were followed by tired eye (12.5%), sore eye (8.6%) and back pain (8.6%). Symptom recorded in our study was high. There could be various reasons: subjects were hospital visitors seeking eye examination, fewer and common symptom categories were used, and subjects had possibility of recall the symptom during the time of computer use.[16] However, Cole et al[17] found the contrasting report which stated there was no clear trend to lend VDU work as a risk factor in 6-year longitudinal study.

Accommodative change comprising of accommodative insufficiency (9.7%), accommodative infacility (35.5%), and lag of accommodation (13.6%), was found in 58.8%of total abnormalities diagnosed. Higher incidence of accommodative dysfunction was also reported previously in different studies.[18,19] Gur and Ron reported decreased accommodative and convergence range significantly before and four days after work on computer.[20] Daum[19] reported blur, headache, and asthenopia were the most common symptoms noted in a retrospective study of patient records containing a diagnosis of accommodative insufficiency. Spending long time on computer screen without pause also can lead to problem of shifting focus screen, documents and keyboard. The constant process of drifting and refocusing on fuzzy pixel of texts on computer screen can leave eyes strained and fatigued.[21] Marginal accommodative response and binocular vision problem can diminish power of accommodation, remove the near point of convergence, and show phoria for near vision in prolong VDT use.[9]

Binocular vision change comprising of convergence insufficiency (9%) and fusional insufficiency (14.8%) was 23.8%of total abnormalities diagnosed. Dain[22] reported significant association between near horizontal phoria and symptoms among VDT users. Gur[20] reported low fusional vergence in 46.9%, heterophoria in 34.4%, and convergence insufficiency in 28.1%in computer users than control. Yekta[23] reported phoria findings and binocular vision anomalies significantly increased at the end of the working day. In our study, exophoria at distance was recorded as 13.2%and near was 15.8%of total subjects in our study. The

magnitude of the phoria did not correlate with the incidence of symptoms in our study and the finding was comparable to the Collins report.[16] Grisham[24] reported headaches, eyestrain, and eye fatigue as symptoms commonly related to convergence insufficiency and to minor disorders of ocular vergence. However, convergence insufficiency was not significantly correlated with symptoms in our study.

Dry eyes appeared to be major contributor to symptom of computer vision syndrome.[9] Computer users often report complaints of eye dryness, burning, grittiness, heaviness, or watering on extended period of computer work.[25] Dry eye can manifest as a result of decreased blink rate and prolonged exposure of ocular surface causing desiccation of the eye. Environmental factors such as working in air conditioned room, dry air, or ventilation fan can also precipitate dry eye. In our study, most of the participants were office workers, bank workers, and computer operators. They might be exposed to the air-conditioned environment during office work. Incidence of dry eye could be anticipated more than the finding we reported (Table 1). This study couldn't assess the battery of test that could have been of much help in diagnosis of dry eye. That might be the reason that we reported dry eye slightly less than the finding reported in other studies. Nakaishi[7] reported dry eye in 33.9% and associated with asthenopic symptom in VDT users. Toda[26] reported diagnosed dry eye in 51.4% patients complaining of ocular fatigue.

Correction of refractive error and wearing properly prescribed glasses were much more powerful factors relieving asthenopic symptoms in VDT users.[14,16,27] In our study, 16 subjects (21.1%) had significant change in glasses. Of them, 15 subjects (19.7%) had other associated abnormalities. Correction of glasses could lead to elimination of symptoms in these subjects. However, refractive error didn't show any significant correlation with ocular symptoms.

Both the total number of work hours per workday and the time spent at the VDT screen seemed to be related to subjective disorders.[28] Stella (2007) suggested that visual symptom complaining were more pronounced in people spending above 8 hours daily at a computer.[1] The symptoms of headache, eyestrain, arthralgia, stiff shoulders, low back pain, and general fatigue were also reported higher with increasing duration of daily VDT use.[29] In our study, students and office workers were found to seek eye examination more than computer operators. In fact, computer operators work more on computer than students and office workers. This finding indicated that duration of computer use was not only the cause for symptoms. However, computer operators might be proficient in eliminating visual difficulties at their workstations; for example adjusting screen contrast regularly or arranging their workstations to eliminate disability glare.[16]

Correlation between symptoms and diagnosed abnormalities in computer workers has variable report. Some studies have agreed the fact that there was a relationship between VDT use and subjective symptoms.[1,15,28,29] Some other studies have not shown the correlation.[6,16] Computer workplace illumination, screen contrast, duration of work on computer, viewing distances and viewing angles, specific work related tasks, pressure, interest, screen reflection; image quality; and work place ergonomics are found to have significant role in manifesting symptoms in VDT users. These variables couldn't certainly be considered in hospital attendees in our study sample.[1,6] Our clinical findings were not significantly correlated with the symptoms reported by the computer users. Reduced tear secretion as indicated by Schirmer's test II was found to have a little role in manifesting the symptoms. Multiple regression analysis only helps in estimating the correlation between dependent variable and independent variables under consideration. The statistical analysis was found to be somewhat biased by the interaction between variables. Variance in the criterion variables as indicated by adjusted R^2 was insignificant.

The results of this study cannot be generalized because of various reasons: relatively small population of VDT users, lack of battery of test to rule out dry eye symptoms, lack of control and comparable groups, lack of assessment on ocular surface related problems, and lack of assessment on visual effect of display characteristics.

On the basis of observations, we noticed computer workers had a high incidence of ocular and systemic symptoms. Most of them had abnormalities associated with accommodation and vergence dysfunctions. However, dry eye was significantly correlated with a small proportion of symptoms. These finding warrants a need of detailed and dedicated evaluation of condition of tear film and associated abnormalities. To identify the root cause of potential health problem, further study can be conducted considering work place environment that can have an effect on causing dry eye. A careful eye examination should be conducted to reveal an ocular complaint associated with VDT usage. Various ocular abnormalities need to be carefully treated to reduce the intensity of symptoms though they were confounded to each other.

Conflict of interests

Authors declare that they don't have any conflict of interests.

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Appendix I Tribhuvan University, Institute of Medicine, Visual Problems Among Video Display Terminal (VDT) Users in Nepal. Research Questionnaire

Do you experience any of the following symptoms while using/ working on computer? If so, please tick accordingly.
Average Hour of computer use: _____hrs per day.

None	**Very mild**	**Mild**	**Moderate**	**Intense**	**Very intense**
0	1	2	3	4	5

Description of rating scale

	None	Very mild	Mild	Moderate	Intense	Very intense
Ocular symptoms						
Watery eyes	☐	☐	☐	☐	☐	☐
Dry eyes	☐	☐	☐	☐	☐	☐
Itchy eyes	☐	☐	☐	☐	☐	☐
Pain behind eyes	☐	☐	☐	☐	☐	☐
Aching eyes	☐	☐	☐	☐	☐	☐
Sore eyes	☐	☐	☐	☐	☐	☐
Tired eyes	☐	☐	☐	☐	☐	☐
Visual symptoms						
Blurred vision	☐	☐	☐	☐	☐	☐
Double vision	☐	☐	☐	☐	☐	☐
Systematic symptoms						
Shoulder pain	☐	☐	☐	☐	☐	☐
Neck pain	☐	☐	☐	☐	☐	☐
Back pain	☐	☐	☐	☐	☐	☐
Headache	☐	☐	☐	☐	☐	☐