Risk factors for computer visual syndrome (CVS) among operators of two call centers in São Paulo, Brazil

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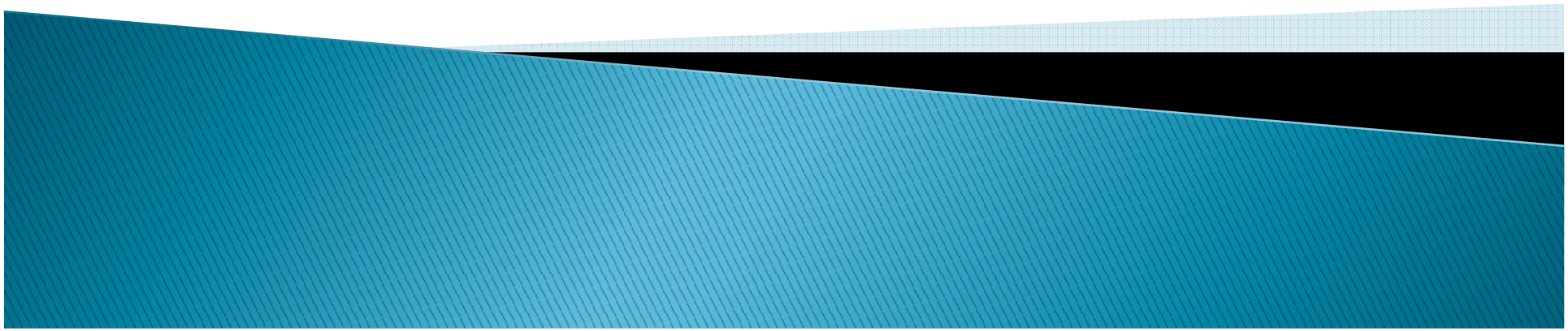

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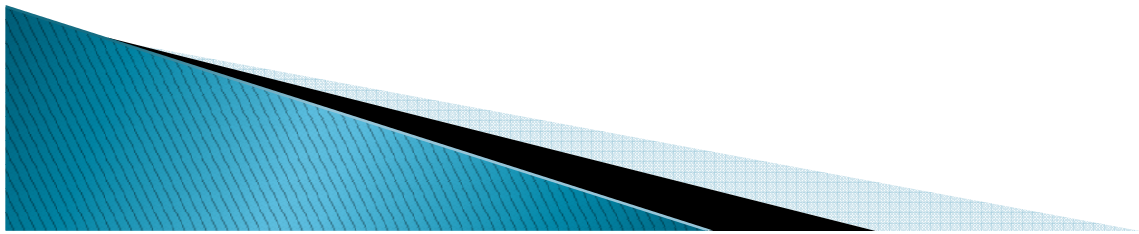
The visual fatigue associated with computer work as Computer Vision Syndrome (CVS) can be characterized by the presence of one or more eye symptoms (visual fatigue, eye fatigue, burning sensation, eye irritation, "redness", "blurred vision" and "dry eyes")

BLEHM *et al.* (2005)



Visual fatigue

The potential pathophysiological mechanisms of CVS (Blehm *et al.*, 2005) in three clusters of symptoms:

- **eye disorders**: local pain, burning sensation, feeling of "burning", changes in blinking frequency, excessive tearing and "dry eye“
- **visual disturbances**: photosensitivity, difficulty focusing (blurred vision), double vision, persistent abnormal image after-image and instability in its optical and spatial definition
- **general disorders**: headaches, migraines, back pain and/or neck pain, muscle spasms in the regions of the neck and shoulders, the latter requires the presence of other ocular symptoms.

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The causes of CVS (Blehm *et al.,* 2005) have been categorized on **intrinsic and extrinsic environmental and extrinsic eye**

The **intrinsic factors** are mainly caused by the mechanism of eye accommodation

The e**xtrinsic environmental factors** include the lighting environmental conditions

The **extrinsic eye factors** include:

- ✓ the decrease in the rate of flashing/blinking
- ✓ the increase of exposure of the ocular surface
- ✓ the use of contact lenses or medication
- ✓ the presence of systemic or external eye diseases

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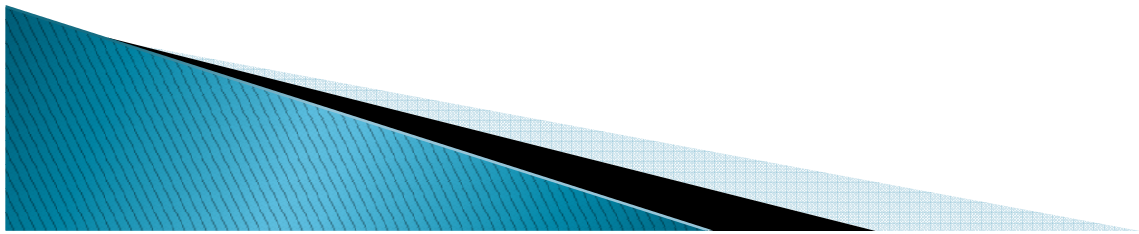
Piccoli, in 2003, describes that the changes in work processes and the increase of the computers' use cause a need for an efficient visual systems

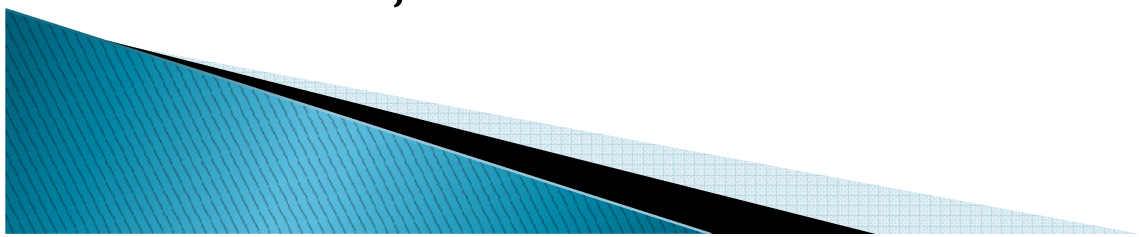
The association between visual disorders and psychosocial work factors is suggested by the idea that visual disturbances are related to:

- ✓ the intensity and duration of visual requirements and to the work situation perceived by the employee
- ✓ the pathophysiological characteristics of the visual system of each individual



The aims of this study were:

- ✓ to investigate the working conditions and organization in call centers
- ✓ to evaluate the prevalence of CVS, among call centers'operators
- ✓ to describe risk factors associated to work conditions and sociodemographic characteristics in two call centers of São Paulo, Brazil

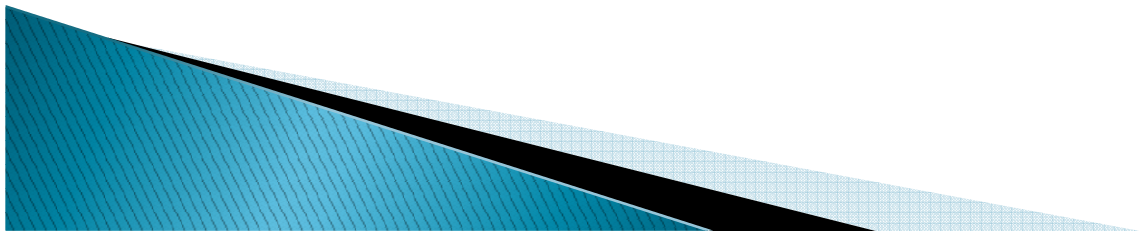


Methods

This was a cross-sectional observational study and an ergonomic work analysis that were conducted in two call centers

Study population

- In total 476 questionnaires were filled: 125 of a central administrator of health plans and 351 of booking center of an airline



Methods

Questionnaire

Structured questionnaire was applied, including questions about visual complaints, adapted by Elias and Cail (1982)

Information collected:

- socio-demographic
- lifestyle habits
- occupational history
- work situation (conditions and work organization)
- factors of satisfaction and factors of fatigue or discomfort at work
- psychosocial aspects
- work-related health effects

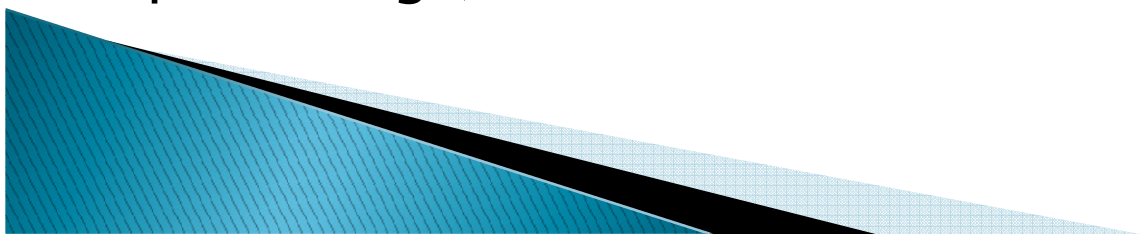
Methods

Questionnaire

The categorization of responses was composed by five alternatives: never, rarely, sometimes, often and always or great, good, fair, poor and bad

Data analysis

The distribution of all variables was described and also the distribution according to the presence of CVS with the absolute and relative frequencies (count and percentage)



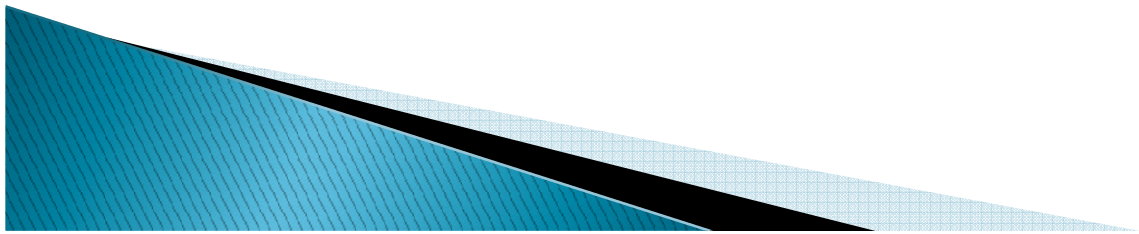
Methods

Data analysis

The eye symptoms were studied based on the division between visual and ocular symptoms described by Blehm *et al.* (2005):

- Oculars symptoms were: "burning" eyes and tearing
- visual symptoms were: eye fatigue, weight in eyes and weakened vision

In this study CVS were considered when operators answered the presence of ocular symptoms as always, often or sometimes

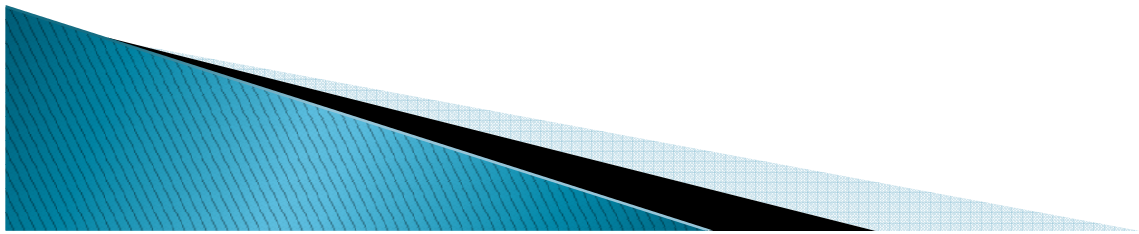


Methods

Data analysis

A factor analysis was carried out to reduce the number of variables related with factors of fatigue or discomfort at work

The application of factor analysis allowed us to obtain factor scores to be used in the second phase, which corresponds to the application of multiple linear regression analysis

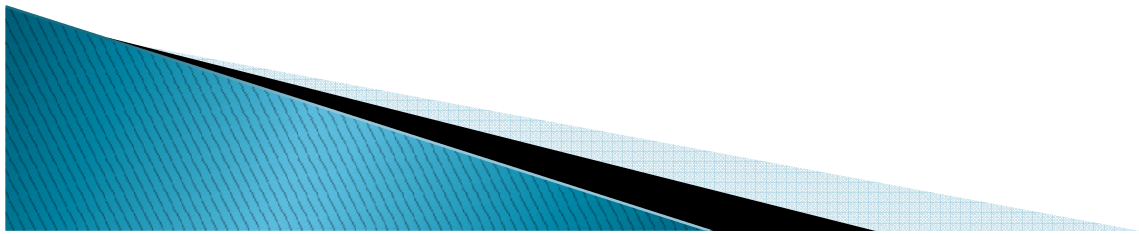


Methods

Data analysis

The multiple logistic regression model was created using the forward stepwise likelihood ratio method

The variables that remained in the final model were the ones with statistical significance levels below 5% ($p < 0.05$)



Results

Table 1- Distribution of telemarketing operators according to socio-demographic characteristics, lifestyle habits and domestic work

	Total	
Characteristics	**N*=476**	**%**
Female	353	(74,8)
Age: 15-24	223	(46,8)
Schooling: College Incomplete	216	(45,4)
Marital Status: Single	337	(70,8)
Never Smoked	309	(64,9)
Alcohol intake Frequency (Once per week)	196	(41,2)
Physical Activities (Yes)	249	(52,3)
Intensity of Domestic Work (None)	302	(63,4)

Results

This study verified a high prevalence of computer visual syndrome among call centers' operators (54,6%)

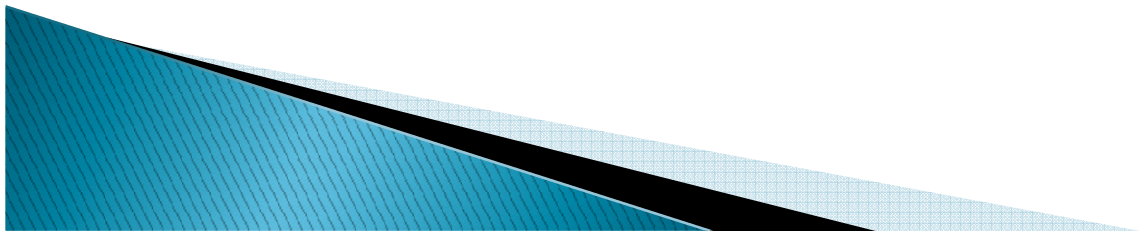
Table 2 – Final regression model of factors associated with CVS

Variables	OR	IC (95%)		P
		Inferior	Superior	
Female Gender	2,58	1,62	4,13	<0,001
Recognition at Work (perception)	1,42	1,14	1,76	0,002
Work Organization in Telemarketing	1,40	1,13	1,75	0,003
Demand	1,13	1,01	1,27	0,041

Discussion

Sanchez-Roman *et al.,* in 1996, analyzed the frequency of asthenopia in call centers' operators in Mexico, using a questionnaire and eye examination verifying a higher prevalence: 68.5%

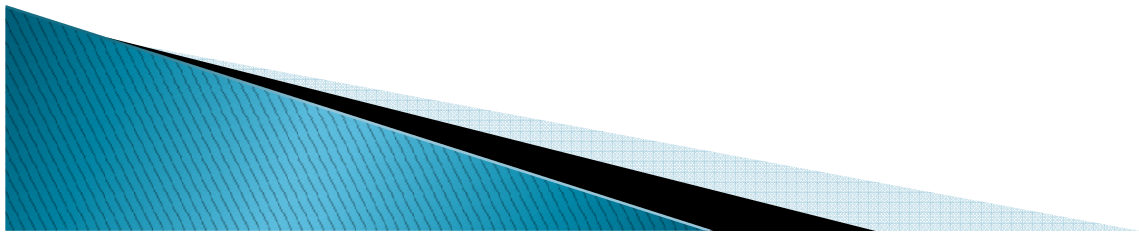
Considering the ocular symptoms the prevalence of "burning" eyes was 51.4% and tearing was 37.1% similar that obtained in this study



Discussion

In India, Bhanderi *et al., in* 2008, analyzing 419 operators who worked using the computer found a prevalence of 46.3% of asthenopia

This result can be explained because they used the computer but they were not call centers' operators that remained sit in front of the terminal during all journey

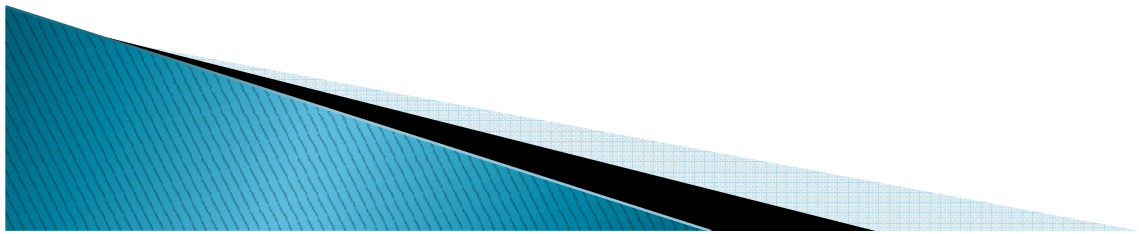


Discussion

The association observed between the presence of CVS and being female was also observed by Rocha and Debert-Ribeiro, in 2004, that studied the systems analysts and visual fatigue

The lack of recognition at work which was observed in this study as associated with CVS included the lack of professional career and autonomy at work and the perception to being

treated as a machine

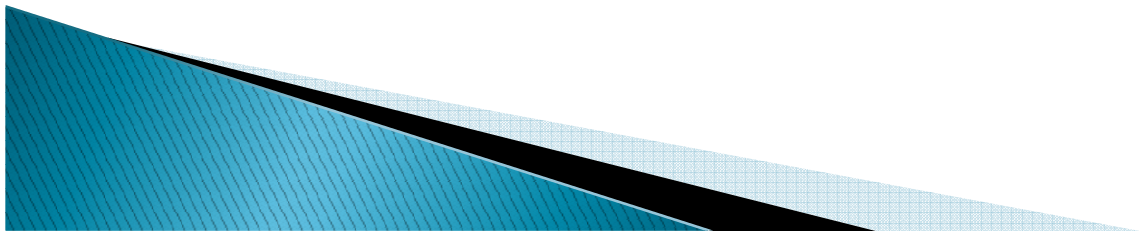


Discussion

In this study we verified that the activity of operators in call centers involves high mental work demands (cognitive and emotional) with low autonomy

Considering the demand-control model by Karasek and Theorell (1990), we can describe the call center operator activity as a high strain job

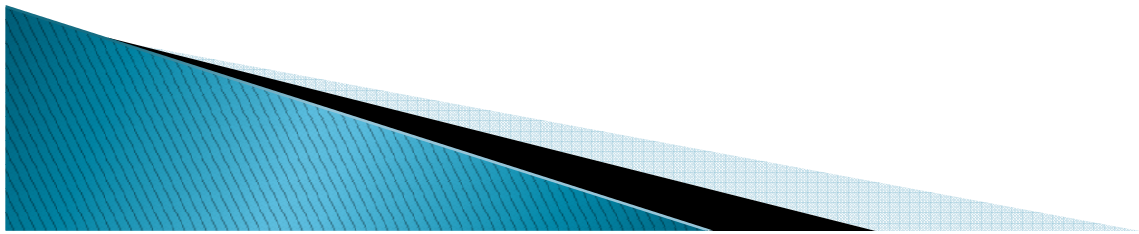
This result was also observed by Toomingas *et al.* (2002) in Swedish call centers



Discussion

The association observed between CVS and the lack of control was also studied by Vilela and Assunção (2004) that detailed the mechanisms of control used by a call center of an enterprise of telephony demonstrating the intense control of their work

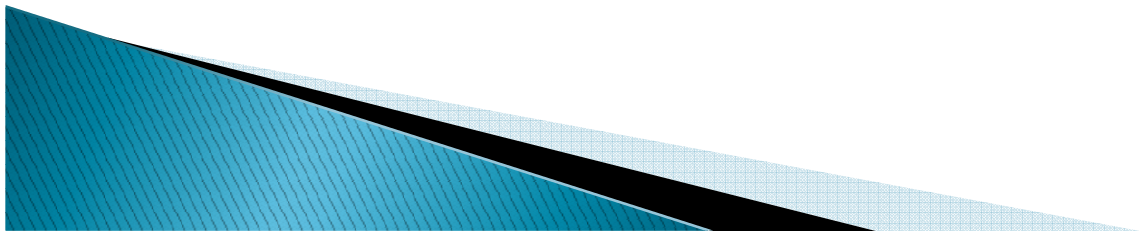
They had the control of the time of each call, the words that had to be used (script), the time that they were in pauses, the volume and the results at work



Discussion

In the study we observed an association between CVS and how is the organization of work in call center with:

- high volume of information
- variety of demands from clients with different cultures
- small number of breaks
- high responsibility

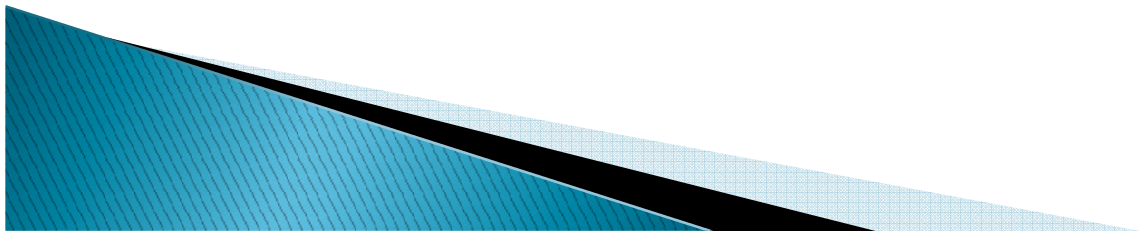


Discussion

In this study we observed an association between CVS and high demand among call centers' operators work.

This results are similar with Sanchez-Roman et al. (1996) that described that asthenopia was associated with working more than four hours in front of the video terminal.

Ghassemi-Broumand and Ayatollah (2008) also verified more ophthalmic complications between workers that use computer for more than 4 hours



Discussion

This study highlights the need for action to change work environment conditions and work organization, to analyze professional activity at call centers and at the same time, of workers characteristics

For Costa and Kara-Jose (2008), the promotion of eye health is necessary to ensure a good quality of life: the individual must have visual ability that allows the development of their capabilities and their participation in society

Discussion

The main limitation of this study was that it was a cross-sectional epidemiological design, not allowing inferences of causality

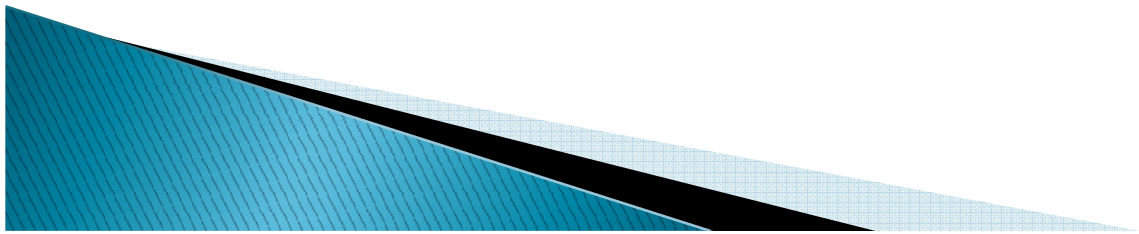
In addition, this study involved only two call centers, not including workers who were removed for reasons of health

This study did not include the eye exams of the operators

On the other hand, this research adds to the literature data about specific factors associated with visual symptoms among call centers' operators

Prevention Strategies

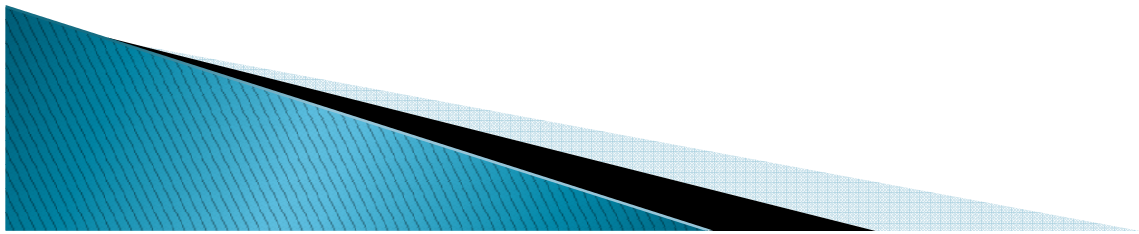
- ✓ Committee of the International Commission of Health
- ✓ European Economic Community (EEC)
- ✓ The Ministry of Work through the Health & Safety Executive/Local Authorities Enforcement Liaison Committee (HELA) from England
- ✓ The Ministry of Work and Employ from Brazil



Conclusions

The results demonstrated the importance of studying the CVS among call centers' operators and that there is an association between the symptoms and working conditions

The program of prevention of CVS should include eye examination periodically among the call Center' operators and the design of the work should take account psychosocial and organizational factors



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