South Health and Policy. 2025; 4:228
doi: 10.56294/shp2025228

ORIGINAL

Covid-19: Telework, symptomatology and visual alterations. Agrofood company. Venezuela. 2021-2023

Covid-19: Teletrabajo, sintomatología y alteraciones visuales. Empresa de alimentos agrarios. Venezuela. 2021-2023

Maryanni K. Gutiérrez[1], María del Carmen Martínez[2], Misael Ron[3]

[1]Empresa Agroalimentaria, Venezuela.
[2]IAE. "Dr. Arnoldo Gabaldon", Venezuela.
[3]Universidad Central de Venezuela, Venezuela.

Cite as: Gutiérrez MK, Martínez M del C, Ron M. Covid-19: Telework, symptomatology and visual alterations. Agrofood company. Venezuela. 2021-2023. South Health and Policy. 2025; 4:228. https://doi.org/10.56294/shp2025228

Submitted: 08-05-2024 **Revised:** 05-09-2024 **Accepted:** 16-01-2025 **Published:** 17-01-2025

Editor: Dr. Telmo Raúl Aveiro-Róbalo

Corresponding author: Maryanni K. Gutiérrez

ABSTRACT

Introduction: during the COVID-19 pandemic, teleworking was implemented as an organizational strategy without evaluating the conditions of home work, causing effects on visual health and increasing consultation in the ophthalmological area.
Objective: to determine the working conditions, ocular symptoms and visual alterations in teleworkers of agri-food companies.
Method: descriptive cross-sectional field research. 23 workers participated. Instruments and technique: review of morbidity records and occupational medical history; visual acuity survey and assessment; Technical Guide for the Assessment and Prevention of Risks Associated with the Use of Display Screen Equipment; Annex III of the Specific Health Surveillance Protocol for workers with data display screens (PVD), CVSS Questionnaire17.
Results: 52 % were female, mean age ±40,7; work seniority ±6,26 years; 100 % of workers telework between 6-8 hours a day. They perceived aspects of the seat, screen, keyboard, computer/worker interconnection, glare-reflections, presence of noise and heat as risk factors. Level of ocular symptomatology: moderate (91 %). Refractive problems: Myopia (67 %) and Astigmatism (55 %). 22 % required the indication of corrective lenses and 38,8 % presented an increase in diopters after the start of teleworking.
Conclusion: the conditions of home work were perceived to be inadequate due to the presence of disergonomic and physical risk factors, as well as long working hours, which generated eye discomfort and increased ocular refraction lesions. Recommendation: reduce teleworking hours, raise awareness about safe working conditions at home and visual epidemiological surveillance.

Keywords: Teleworking; Terminal Video; Ocular Symptom; Visual Alterations.

RESUMEN

Introducción: durante la pandemia COVID-19 se implementó el teletrabajo como estrategia organizativa sin evaluar las condiciones de trabajo domiciliario, ocasionando efectos sobre la salud visual e incrementando la consulta en el área oftalmológica.
Objetivo: determinar las condiciones de trabajo, sintomatología ocular y alteraciones visuales en teletrabajadores de empresa agroalimentaria.
Método: investigación descriptiva de campo de corte transversal. Participaron 23 trabajadores. Instrumentos y técnica: revisión de registros de morbilidad e historia médica laboral; encuesta y evaluación de agudeza visual;

Guía técnica para la evaluación y prevención de los riesgos relativos a la utilización de equipos de pantallas de visualización; Anexo III del Protocolo de Vigilancia Sanitaria específica para los/as trabajadores/as con pantallas de visualización de datos (PVD), Cuestionario CVSS17.
Resultados: 52 % son de sexo femenino, promedio de edad ±40,7; antigüedad laboral ±6,26 años; 100 % de los trabajadores teletrabajo entre 6-8 horas diarias. Percibieron como factores de riesgo aspectos del asiento, pantalla, teclado, interconexión ordenador/ trabajador, reflejos-deslumbramiento, presencia de ruido y calor. Nivel de sintomatología ocular: moderado (91 %). Problemas de refracción: miopía (67 %) y astigmatismo (55 %). El 22 % ameritó indicación de lentes correctivos y el 38,8 % presentó incremento de dioptrías posterior al inicio del teletrabajo.
Conclusión: se percibieron inadecuadas las condiciones de trabajo domiciliario debido a la presencia de factores de riesgo disergonómicos y físicos, así como jornadas prolongadas de trabajo, que generaron molestias oculares e incremento las lesiones de refracción ocular. Se recomienda disminuir horas de teletrabajo, concientizar sobre condiciones seguras de trabajo en el domicilio y vigilancia epidemiológica visual.

Palabras clave: Teletrabajo; Video Terminales; Síntoma Ocular; Alteraciones Visuales.

INTRODUCTION

From the year 2021, with the pandemic of COVID 19, workplaces and, therefore, the working population were forced to adopt a form of work organization, the modality of teleworking, and thus comply with social isolation and avoid contagions, causing a boom in the dependence on technological devices as work tools, such as laptops and smartphones, without considering the consequences that this new form of work organization could cause on health, mainly of visual nature, psychic load and musculoskeletal discomfort given by the biomechanical commitment to the performance of their tasks.

In Venezuela, according to Presidential Decree No. 4.198 of May 12, 2020, a state of alarm was declared to address the Health Emergency of Coronavirus COVID-19 (Official Gazette No. 6.525), where social, economic, and sanitary measures were adopted, as well as the adaptation of new organizational strategies by employers to continue administrative and production activities, among them the agri-food sector.[1]

The spaces adopted by the teleworkers, if not correctly implemented, could lead the working user of ICT screens to the appearance of symptoms and visual pathologies due to the diversity of conditions that interact with the work environment and health.

The authors González et al.[2] point out that ocular symptoms are categorized into ocular disorders, visual disorders, and extraocular disorders. The first one is the consequence of the decrease in the frequency of blinking, which results in deficient lubrication of the cornea and an increase in the risk of ocular dryness, producing a sensation of itching, burning, irritation, pricking, redness, tearing, etc.; At the same time, visual disorders can present blurred or double vision, difficulty focusing on objects, photophobia, accommodative asthenopia, and convergence asthenopia due to the continuous need to adapt to different approaches. Also, personal antecedents such as the presence of previous visual disorders (myopia, hyperopia, astigmatism, presbyopia, or uveitis), diabetes, or migraines may play a role. Extraocular disorders often result from forced positions assumed by the worker to be able to see the screen properly, giving rise to back, neck, and shoulder pain regularly. Thus, Vallejo et al.[3] point out that 90 % of the people who use electronic devices may develop visual disorders, being latent risk factors the working conditions with the exacerbation of refraction or accommodation problems.

Meneses et al.[4] conducted a study on computer visual syndrome (CVI) in medical students with virtual education at the Peruvian University, finding a frequency of 93 % of CVI, primarily young adults of female sex; 44 % reported myopia and 22 % astigmatism. The most frequent visual symptoms were tearing (7,9 %), itching (7,6 %) and eyelid heaviness (7,2 %). As an extraocular symptom, headache was reported (7,6 %)(p.25).

On the other hand, Fernández et al.[5] point out (with the application of the CVSS17 form) that ocular fatigue is a symptomatology that appears due to technological progress and prolonged use of computers. Likewise, Montes et al.[6] show a significant association between exposure time and the appearance of eye fatigue symptoms and a relationship with female gender and the use of contact lenses.

Within this new labor context (telework) implemented since the beginning of the pandemic and by the end of 2023, was maintained partially for 3 days a week and two days in an office in a group of workers in the area of technology and information of an agri-food company, it was proposed as objective: to determine the conditions of work that generate ocular symptoms and visual alterations in teleworkers of agri-food company in Venezuela. Period 2021 - 2023.

METHOD

The present study was conducted with a positivist approach under a quantitative methodological design, which was descriptive of the field of cross-sectional cut. The population consisted of 31 workers in the Technology and Information area. The purposive random sample consisted of 23 workers (74 %) who met the established inclusion criteria: workers with exposure to video terminals (digital display screens and cellular telephony), being from the information technology area during the pandemic period, being active in the payroll at the time of the study, participating voluntarily, with acceptance and signature of informed consent.

The following techniques were applied for data collection: review of morbidity records and work medical history, survey, and visual acuity assessment. The following instruments were used:

1. Technical Guide for the evaluation and prevention of risks related to the use of display screen equipment of the National Institute of Safety and Health at Work [INSST] 2021(7), which establishes the minimum safety and health provisions for the use of display screen equipment by teleworkers. The Guide considers three elements: the equipment, the environment, and the computer/person interconnection.

2. Annex III of the Specific Health Surveillance Protocol for workers with data display screens (1999),[8] corresponding to the ophthalmological examination in jobs with PVD and which allows describing the elements of the work organization; and

3. The CVSS17 Questionnaire (Computer-Vision Symptom Scale, 2014) to identify and establish the level of ocular and visual symptoms related to using computers and other data display screens. The level of symptomatology is classified into three levels: mild level (17 to 28 pts), moderate level (29 to 42 pts), and severe level (43 to 53 pts), based on the score when integrating the totality of responses. The organized data were analyzed using measures of central tendency.[9]

RESULTS

Table 1. Socio-demographic and labor characteristics of the personnel of the technology and information area of an agro-food company in the state of Lara. 2021-2023. (n=23)

Sociodemographic and labor variables	n	%
Age group (age in years)		
28 - 33	3	13
34 - 39	9	40
40 - 45	4	17
46 - 51	4	17
52 - 57	3	13
Range = 28 to 57. $\overline{X}$ = 40.7± SD=7.80±.		
Sex		
Female	12	52
Male	11	48
Educational Level		
TSU Complete	4	17
University Incomplete	1	4
University Degree Complete	18	78
Type of contract		
Permanent	23	100
Seniority (years)		
1 - 5	14	60,8
6 - 10	6	26
> than 10	3	13,2
Range = 1 to 23. $\overline{X}$ = 6,26± SD= 5,30±		
Position		
Specialist Coordinator	19	83
Coordinator	3	13
Manager	1	4

Source: Research data / Occupational Medical History. June 2023

It is observed in the group of teleworkers an average age of 40,7 years of age, where 53 % is located between the ages of 28 and 39 years, which implies that they are a young adult population, with a slight predominance of the female sex (52 %) and an educational level of complete university in 78 %. Regarding labor characteristics, 100 % are permanent workers, 83 % are operational personnel with specialist positions (83 %), and an average

length of service of 6,26 years, which implies labor stability.

The results of the organizational, dysergonomic, and physical risk factors related to the homework environment perceived by teleworkers are shown in tables 2a and 2b.

Table 2a. Organizational risk factors of the home teleworking activity. Agri-food company. Lara State. 2021-2023

Organizational risk factors	**n**	**%**
Use of screens		
Screen work	23	100
Telework hours per week		
From 40 to 48 hours	17	74
49 to 56 hours	4	17
60 hours and more	2	9
Estimated daily hours of work in front of the computer		
6 to 8 hours	20	87
More than 8 hours	3	13
Number of breaks taken during the daily working day		
0 breaks	3	13
1 - 2 breaks	7	31
3 - 4 breaks	10	43
5 - 6 breaks	1	4
No answer	2	9
Estimated time duration of breaks during the daily work day		
0 - 30 minutes	15	65
More than 30 minutes - 60 minutes	5	22
More than 60 minutes	1	4
No response	2	9
Type of work		
Programming	2	9
Dialogs	5	22
Data collection	1	4
Mixed type tasks	15	65

Source: Annex III of the Protocol for Specific Surveillance of Workers Exposed to Data Display Screens. June 2023

Regardless of their position, 100 % of the workers studied carry out activities with PVD. Seventy-four percent reported working between 40 and 48 hours per week, and 87 % estimated that they worked 6 to 8 hours per day in front of the computer to carry out the programmed activities. Some 43 % took between 3 and 4 breaks during the workday, and 65 % estimated the breaks' duration to be less than 30 minutes. Regarding the type of work, 65 % perform mixed tasks (scheduling, virtual meetings, program follow-up), 22 % perform dialogue tasks (only virtual communication versus PVD), 9 % perform scheduling activities, and 4 % only data collection.

Table 2b. Dysergonomic and physical risk factors perceived with the use of PVD in teleworkers of agro-food company. Lara State. 2021- 2023

Dysergonomic and physical factors	**Risk perception**	
Variables	**n**	**%**
EQUIPMENT		
General considerations	2	8,6
Display	13	56,5
Keyboard	13	56,5
Table or work surface	10	43,4
Work seat	19	82,6
ENVIRONMENT		
Space	4	17,3
Lighting	2	8,6
Reflections and glare	9	39,1
Noise	10	43,4
Heat	8	34,7
Emissions	7	30,4

INTERCONNECTION		
Computer / Worker Interconnection	4	17,3

Source: Technical guide for the assessment of risks related to the use of display screen equipment. June 2023.

82,6 % of workers perceive aspects related to the work seat and 56,5 % to the screen and keyboard as dysergonomic risk factors. Regarding the computer/worker interconnection element, only 17,3 % perceived it as a dysergonomic risk factor. The physical risk factors perceived by teleworkers are noise (43,4 %), reflections and glare (39,1 %), and heat (34,7 %).

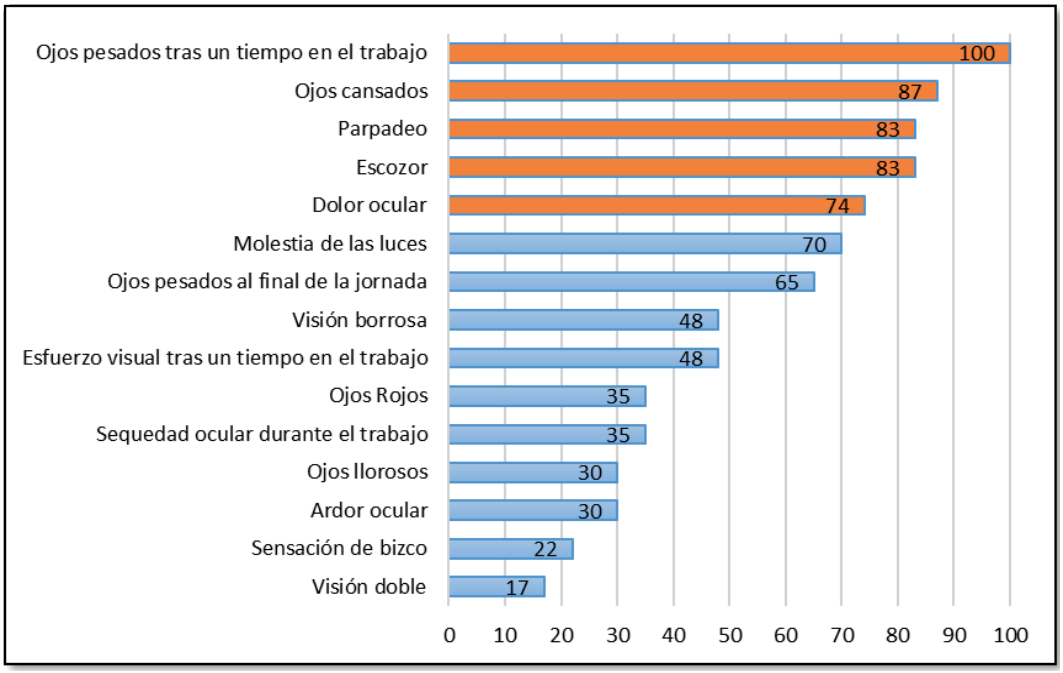

Figure 1. Percentage distribution of ocular symptoms identified by use of VDTs in teleworkers. Agroalimentary Company. Lara State. 2021-2023. (n=23). Source: Data derived from CVSS17. June 2023.

Figure 1 shows the ocular symptoms due to VDT use in the study population; the first five being: heavy eyes after some time at work, tired eyes, blinking, stinging and eye pain. The level of severity of ocular symptoms was also determined (table 3).

Table 3. Level of ocular symptoms in teleworkers using VDTs and cellular telephony. Agri-food company. Lara State. 2021-2023 (n=23)

Level of ocular symptomatology	**n**	**%**
Mild	2	9
Moderate	21	91

Source: CVSS17 Questionnaire. June 2023

The moderate level of ocular symptomatology predominates in 91 % of the teleworkers with a score between 29 and 35 points. No worker was found with severe level of symptomatology.

The results obtained from the ophthalmologic evaluation, carried out with Annex III of the Health Surveillance Protocol specific for workers with visual display screens, are presented below:

Of the 23 workers studied, only 5 (22 %) resulted with normal vision and 78 % (18) have refractive problems. Likewise, 22 % were diagnosed with pterygium. As for the visual alterations, the results were (table 4).

Table 4. Visual disturbances diagnosed in workers exposed to VDTs and cellular telephony. Agri-food company. Lara State. 2023. (n= 18)

Visual Alterations	**n**	**%**
Refractive Problems		
Hyperopia	4	22
Myopia	12	67
Astigmatism	10	55

Presbyopia	7	38
Lens Wearing		
Before Teleworking	14	78
During Telework	4	22
Perception of vision		
Improved	9	50
Worsened	1	6
Is the same	8	44

Source: Annex III of the Protocol for specific surveillance for workers with PVD. June-August 2023.

The most frequent refractive problems are Myopia and Astigmatism. In relation to the use of glasses, there was an increase of 22 % after the beginning of teleworking and 38,8 % who already used corrective lenses presented an increase in diopters after the beginning of teleworking. 50 % reported improved vision.

DISCUSSION

The present investigation allowed us to determine the conditions of work that generate the risk of ocular symptomatology and visual alterations in teleworkers of an agro-alimentary company inside the context of the pandemic by COVID-19, being found for the socio-demographic and labor characteristics of a young adult population with an average age of 40,7 years, with a predominance of the feminine sex, results similar to those described by Meneses et al.[4] González, A.[10] and Larrea,[11] who note that women have a high prevalence in the development of digital tasks, in addition to a higher frequency of SVI compared to men, which may be due to hormonal factors, external factors or the type of occupation. Likewise, other characteristics, such as seniority, educational level, and kind of contracting, resulted in labor variables similar to the study population of González, A.[10] and Cabezas, H. E, Molina G. F, Delgado, J and Ruiz D.[12], because they are personnel with university education and seniority greater than five years; which corresponds to trained workers with experience and labor stability like our study sample.

In the new organizational form of telework, the work activity and the time of exposure in front of the video terminals resulted in the workers of the study maintaining a continuous interaction with portable equipment for the fulfillment of the administrative and operative requirements of the organization, an estimated time greater than six hours daily in front of the computer; similar to the scenarios described by González, A.[10] Castellanos[13] and Meneses, et al.[4] in which the evaluated workers executed tasks related to the administrative management and daily requirements of the operative area within a working day of eight hours of work. Meneses et al.[4] indicated that 43 % of them used PVD for more than six hours, and Cabezas et al.[12] 90,1 % used it for more than four hours uninterruptedly, which estimates a high probability of occurrence of ocular symptomatology in teleworkers.

On the other hand, the dysergonomic risk factors, which refer to the workspaces or places within the home, work tools, and the computer/worker interconnection, were perceived as not ergonomic due to an inadequate relationship with some of the accessories of the equipment, mainly: the chair, the table or work surface, the keyboard, and the screen. Like Larrea[11] and Castellanos,[13] they perceive that these teleworking places are not ideal from the ergonomic point of view because they do not have adequate furniture. As a consequence, they are generating factors of visual and musculoskeletal alterations.

In addition to these, it was found that physical risk factors, such as high temperatures and noise, are present in the physical workspace; Montes et al.[6] point out that a hot environment (heat), with low humidity and insufficient ventilation, favor the appearance of OWS symptoms; showing similarity with the perception of the workers in the present investigation, where heat was the main physical risk perceived in the work environment, followed by noise and reflections and glare.

Regarding eye symptoms, five symptoms were observed in more than 70 % of the study participants: heavy eyes after some time at the computer in 100 %, followed by tired eyes (87 %), blinking and stinging (83 %), and eye pain (74 %). This is similar to the results obtained by González, A.[10] and Meneses et al. (4), whose predominant symptoms were itching or stinging (76 %), tearing (7,9 %), tired eyes (7,2 %), blinking (6,5 %), eye pain (5,5 %) and headache (61,90 %) as an extraocular symptom. Its appearance was related to prolonged exposure to the computer and the user's tasks, which implies the need for accentuated visual attention, affecting all the protective factors of the eye.

In relation to the level of ocular symptomatology, a moderate level predominated in 91.8 % and an 8,6 % mild level, similar to that obtained by Cabezas et al.[12] where they showed a moderate level of symptomatology in 92,4 %, followed by a mild level in 6,4 % and a severe level in 1,2 %.[4] and Cabezas et al.[12] where the most frequent refractive problems in teleworkers were myopia and astigmatism, noting that most often these are already diagnosed pathologies, but with the confinement by the COVID-19 and the implementation of teleworking were exacerbated due to the use of PDV. To improve vision perception, the study population presented a 22 % increase in using corrective lenses during telework.

CONCLUSIONS

According to the results obtained, it is concluded that the personnel of the technology and information area is a young adult population with a predominance of the female sex who perceived the home working conditions due to the presence of poor ergonomic aspects related to the computer/worker interconnection, poor adaptation with tools and work equipment and the presence of uncontrolled physical risks (noise, heat, reflections and glare) typical of the work environment during the COVID-19 pandemic period (2021- 2023).

Ocular discomfort and visual difficulty were generated, forcing workers to consult the medical service. There was an increase of 22 % in the need and indication of corrective lenses, and 38,8 % presented an increase in diopters after the beginning of teleworking.

According to these findings, it is recommended from the organizational point of view to reduce teleworking hours and, from the point of view of occupational health, to instruct and support teleworkers about safe working conditions at home to improve the interaction between the worker-equipment - elements of the environment and therefore the perception of ergonomic conditions according to their environment; in addition to maintaining control of visual epidemiological surveillance and promote the realization of active visual breaks.

REFERENCES

1. Venezuela. Decreto N° 4.198 del 12 de mayo de 2020. Gaceta Oficial Extraordinaria N° 6.519. Decreto de Estado de Alarma para atender la Emergencia Sanitaria del COVID-19. Caracas: Presidencia de la República; 2020. https://pandectasdigital.blogspot.com/2020/05/decreto-n-4198-de-fecha-12-de-mayo-de.html

2. González ME, López GMJ, González MS, García GG, Álvarez BT. Principales consecuencias para la salud derivadas del uso continuado de nuevos dispositivos electrónicos con PVD. Rev Esp Salud Pública. 2019 Ago; http://scielo.isciii.es

3. Vallejo LAB. Impacto de la tecnología en la salud de la población del siglo XXI. RECIMUNDO. 2022;6(1):117-28. https://recimundo.com/index.php/es/article/view/1579

4. Meneses R, Ramos S, Molfino C, Sánchez E, Stein D, Chávez L. Síndrome Visual Informático en estudiantes de Medicina en educación virtual de una universidad peruana durante el 2021. Rev Fac Med Hum. 2021;21(3):521-9. http://revistas.urp.edu.pe/index.php/RFMH

5. Fernández VE, Vizcaíno NF, Llerena OL, Baño NF. Determinación de la fatiga ocular debido al teletrabajo en docentes de la Universidad UNIANDES de Ecuador. Dilemas Contemp Educ Polít Valores. 2021 Jun; https://www.scielo.org.mx/scielo.php?pid=S2007-78902021000200049&script=sci_arttext

6. Montes PA, Morales CA, Navar MJ, Prado MA. Síndrome de fatiga ocular y su relación con el medio laboral. Med Segur Trab. 2017 Dic;63(249):345-55. http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S0465-546X2017000400345

7. Instituto Nacional de Seguridad y Salud en el Trabajo (España). Guía técnica para la evaluación y prevención de los riesgos relativos a la utilización de equipos con pantallas de visualización. Madrid: INSST; 2021 Jun. https://www.insst.es/documents/94886/789467/u%C3%ADa+t%C3%A9cnica+para+la+evaluaci%C3%B3n+y+prevenci%C3%B3n+de+los+riesgos+relativos+a+la+utilizaci%C3%B3n+de+equipos+con+pantallas+de+visualizaci%C3%B3n.pdf

8. España. Real Decreto 488/1997, de 14 de abril, sobre disposiciones mínimas de seguridad y salud relativas al trabajo con equipos que incluyen pantallas de visualización. Boletín Oficial del Estado; 1997 mayo. https://www.boe.es/eli/es/rd/1997/04/14/488/con

9. Vidal CN, Duque TA. Medición de síntomas visuales en trabajadores expuestos a computador utilizando el cuestionario CVSS17. Bogotá: Universidad Antonio Nariño; 2020. http://repositorio.uan.edu.co/bitstream/123456789/2674/1/2020LuzAndreaDuqueTaborda.pdf

10. González A. Alteraciones visuales y nivel de riesgo por el uso de videoterminales en una empresa distribuidora de equipos médicos [tesis]. Maracay: Universidad Central de Venezuela; 2019.

11. Larrea CA. Ergonomic Risk Factors of Teleworking in Ecuador during the COVID-19 Pandemic: A Cross-Sectional Study. Int J Environ Res Public Health. 2021 May;18(9):4786. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8151790/

12. Cabezas HE, Molina GF, Delgado J, Ruiz D. Visual Fatigue and Telework in University Staff: Case Study. J Posit Sch Psychol. 2022; https://journalppw.com/index.php/jpsp/article/view/7621

13. Castellanos M. Evaluación ergonómica de personal administrativo que realiza teletrabajo en una compañía comercializadora de productos alimenticios. Quito: Universidad Internacional SEK; 2018. https://repositorio.uisek.edu.ec/handle/123456789/3131

FINANCING

None.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

Conceptualization: Maryanni K. Gutiérrez, María del Carmen Martínez, Misael Ron.
Data curation: Maryanni K. Gutiérrez, María del Carmen Martínez, Misael Ron.
Formal analysis: Maryanni K. Gutiérrez, María del Carmen Martínez, Misael Ron.
Research: Maryanni K. Gutiérrez, María del Carmen Martínez, Misael Ron.
Methodology: Maryanni K. Gutiérrez, María del Carmen Martínez, Misael Ron.
Project Management: Maryanni K. Gutiérrez, María del Carmen Martínez, Misael Ron.
Resources: Maryanni K. Gutiérrez, María del Carmen Martínez, Misael Ron.
Software: Maryanni K. Gutiérrez, María del Carmen Martínez, Misael Ron.
Supervision: Maryanni K. Gutiérrez, María del Carmen Martínez, Misael Ron.
Validation: Maryanni K. Gutiérrez, María del Carmen Martínez, Misael Ron.
Visualization: Maryanni K. Gutiérrez, María del Carmen Martínez, Misael Ron.
Writing - original draft: Maryanni K. Gutiérrez, María del Carmen Martínez, Misael Ron.
Writing - proofreading and editing: Maryanni K. Gutiérrez, María del Carmen Martínez, Misael Ron.