CIÊNCIAS SOCIALMENTE APLICÁVEIS:

INTEGRANDO SABERES E ABRINDO CAMINHOS

JORGE JOSÉ MARTINS RODRIGUES
MARIA AMÉLIA MARQUES
(Organizadores)

VOL IX

EDITORA ARTEMIS
2023

CIÊNCIAS SOCIALMENTE APLICÁVEIS:

INTEGRANDO SABERES E ABRINDO CAMINHOS

JORGE JOSÉ MARTINS RODRIGUES
MARIA AMÉLIA MARQUES
(Organizadores)

VOL IX

EDITORA ARTEMIS
2023

Editora Chefe	Profª Drª Antonella Carvalho de Oliveira
Editora Executiva	M.ª Viviane Carvalho Mocellin
Direção de Arte	M.ª Bruna Bejarano
Diagramação	Elisangela Abreu
Organizadores	Prof. Dr. Jorge José Martins Rodrigues Prof.ª Dr.ª Maria Amélia Marques
Imagem da Capa	cienpies
Bibliotecário	Maurício Amormino Júnior – CRB6/2422

Editora Artemis
Curitiba-PR Brasil
www.editoraartemis.com.br
e-mail:publicar@editoraartemis.com.br

Editora Artemis
Curitiba-PR Brasil
www.editoraartemis.com.br
e-mail:publicar@editoraartemis.com.br

Dados Internacionais de Catalogação na Publicação (CIP)
(eDOC BRASIL, Belo Horizonte/MG)

C569 Ciências socialmente aplicáveis [livro eletrônico] : integrando saberes e abrindo caminhos: vol. IX / Organizadores Jorge Rodrigues, Maria Amélia Marques. – Curitiba, PR: Artemis, 2023.

Formato: PDF
Requisitos de sistema: Adobe Acrobat Reader
Modo de acesso: World Wide Web
Inclui bibliografia
Edição bilíngue
ISBN 978-65-87396-82-8
DOI 10.37572/EdArt_290523828

1. Ciências sociais aplicadas – Pesquisa – Brasil. 2. Abordagem interdisciplinar do conhecimento. I. Rodrigues, Jorge José Martins. II. Marques, Maria Amélia.

CDD 307

Elaborado por Maurício Amormino Júnior – CRB6/2422

EDITORA ARTEMIS
2023

Editora Artemis
Curitiba-PR Brasil
www.editoraartemis.com.br
e-mail:publicar@editoraartemis.com.br

APRESENTAÇÃO

O nono volume desta colecção segue a lógica dos livros anteriores. Procura apresentar ao leitor uma coletânea de artigos sobre problemáticas que são transversais ao campo das ciências sociais aplicadas.

Sendo discutível, na metodologia seguida na organização dos vários volumes procurou-se privilegiar artigos que abordassem novas tendências e/ou problemáticas transversais relevantes, adotassem metodologias mais holísticas e/ou modelos de investigação aplicada, apresentassem estudos de caso nacionais e/ou internacionais e procurassem ser reflexivos. Nesse contexto, o nono volume está organizado em quatro grandes eixos – Planeamento e informação, Turismo, Saúde e ergonomia, Direito.

Na construção da estrutura de cada eixo procurou-se seguir uma lógica em que cada artigo possa contribuir para uma melhor compreensão do artigo seguinte, gerando-se um fluxo de conhecimento acumulado que se pretende fluido e em espiral crescente.

Assim, o eixo Planeamento e informação, é constituído por um conjunto de quatro artigos. O planeamento dos territórios urbanos influencia a arquitectura das cidades e os seus equipamentos. Assim, o recurso aos sistemas de informação geográficos e cadastrais, enquanto sistemas geradores de informação e conhecimento, poderão ser bons preditores e auxiliares de gestão do risco, quer das cidades quer dos seus equipamentos.

O eixo Turismo junta um conjunto de sete artigos que, em comum, contribuem para optimizar os serviços e melhorar a imagem do turismo e do património cultural. A afectação ágil de recursos às actividades que mais deles necessitam, em cada momento, é um bom indicador de eficiência e de qualidade do serviço prestado. Esta flexibilidade permite redireccionar os diferentes imaginários e expectativas culturais e espaciais dos turistas, nas diferentes épocas do ano.

No eixo Saúde e ergonomia, composto por seis artigos, subjaz que uma política de avaliação de serviços de saúde necessita da medição dos seus efeitos, da comparação com outros indicadores e de incentivos. Este pressuposto contraria a falácia de quanto mais idade se tem mais se sabe sobre sexualidade e reprodução. Os riscos associados a tal ideia induzem à forte necessidade de formação contínua e treino de competências para a prevenção e promoção da saúde, onde se incluem os métodos ergonómicos, por forma a poupar energia.

O eixo Direito é composto por quatro artigos. Os normativos legais, em geral, obedecem a princípios éticos universais. Contudo, ainda há muitas lacunas a superar, nomeadamente quanto aos direitos femininos, com a ganância e a corrupção sempre à espreita.

Com a disponibilização deste livro e seus artigos esperamos que os mesmos gerem inquietude intelectual e curiosidade científica, procurando a satisfação de novas necessidades e descobertas, motor de todas as fontes de inovação.

Jorge Rodrigues, ISCAL/IPL, Portugal
Maria Amélia Marques, IPS/ESCE, Portugal

SUMÁRIO

PLANEAMENTO E INFORMAÇÃO

DIREITO

CAPÍTULO 15

POSTURAL RISK ASSESSMENT OF OFFICE STAFF IN A PUBLIC UNIVERSITY

Data de submissão: 26/04/2023
Data de aceite: 09/05/2023

Julio César Cano Gutierrez, Ph.D.
Research Professor
School of Engineering,
Architecture and Design
Universidad Autónoma de Baja California
Ensenada, Baja California, Mexico
https://orcid.org/0000-0001-7803-6706

Alejandra García Becerra
Ph.D. in Industrial Engineering Sciences
Universidad Autónoma de Baja California
Ensenada, Baja California, Mexico
https://orcid.org/0000-0003-1681-6509

Claudia Camargo Wilson
Research Professor
School of Engineering,
Architecture and Design
Autonomous University of Baja California
Ensenada, Baja California, Mexico
https://orcid.org/0000-0001-9102-3694

Jesús Everardo Olguín Tiznado
Research Professor
School of Engineering,
Architecture and Design
Autonomous University of Baja California
Ensenada, Baja California, Mexico
https://orcid.org/0000-0002-6205-0973

Juan Andrés López Barrera
Research Professor
Faculty of Chemical
Sciences and Engineering
Autonomous University of Baja California
Tijuana, Baja California, Mexico
https://orcid.org/0000-0002-5477-033X

Lidia Yolanda Ramírez Ríos, Ph.D.
Professor
School of Engineering,
Architecture and Design
Autonomous University of Baja California
Ensenada, Baja California, Mexico
https://orcid.org/0000-0002-3165-1901

Melissa Ayrem Cázarez Manríquez, Ph.D.
Professor
School of Engineering,
Architecture and Design
Autonomous University of Baja California
Ensenada, Baja California, Mexico
https://orcid.org/0000-0002-2058-1207

Abraham Aranda Avilés, M.I.
Master's Degree in Engineering
Universidad Autónoma de Baja California
Ensenada, Baja California, México

ABSTRACT: The aim of this study was to carry out an ergonomic evaluation in order to propose recommendations to help in the correction and prevention of musculoskeletal disorders (MSD) due to the postural load of 12

secretaries of a public university. To fulfill this purpose, the ergonomic methods ROSA, REBA, OWAS and OCRA Check List were applied to analyze the anthropometric and postural measurements. From the results obtained with the ROSA method, it was identified that 6 secretaries present postural risks; with respect to the REBA method, 7 secretaries register a medium risk level; finally, with the OWAS and OCRA Check List methods, the results show the absence of postural risk in the secretaries. Based on the analysis of the results, recommendations for ergonomic improvement in the workstations are proposed.
KEYWORDS: Ergonomics. Postural stress. Musculoskeletal disorders. Secretaries. Offices.

1 INTRODUCTION

The International Labor Organization (ILO, 2013) mentions that occupational diseases cause a greater number of deaths than occupational accidents, and that of the 2.34 million annual work-related deaths, about 2 million are caused by these diseases, and also mentions that technological and social changes and economic conditions are increasing the danger and creating new risks, causing an increase in workers with musculoskeletal disorders (MSDs) and occupational diseases associated with it. MSDs of occupational origin, are alterations in muscles, joints, tendons, ligaments, nerves, bones and the circulatory system, whose origin lies in the work and its environment, causing cumulative disorders resulting from exposure to repetitive activity or forced postures for prolonged periods (EU-OSHA, 2017) being one of the most frequent work-related diseases associated with high costs due to increased absenteeism. Among the most common MSDs are back pain and carpal tunnel syndrome (CDC, 2016 and NIOSH, 2004). MSDs unlike other occupational injuries, may have their origin not in a single factor, but in several, which include physical or biomechanical, psychosocial and individual factors (Garcia et al. 2013), caused by inflexible and high intensity work cycles, repetitive movements performed at high speeds, high productivity rates, as well as the use of ergonomic equipment and inadequate office furniture (Da Silva et al, 2014 and Muñoz and Velasco, 2015).

Based on statistics from the Ministry of Labor and Social Welfare (STPS, 2013), in Mexico, dorsopathy diseases, carpal tunnel syndrome and shoulder injuries represented at the national level 18.7%, 19% and 25.7% during 2014, 2015 and 2016 respectively; while in Baja California, during the same period they represented 17%, 16.4% and 19.8%. On the other hand, disability rulings according to their nature of injury, during the same period, dorsopathy disease represented at national level 13.1%, 13.5% and 14.7%, and in Baja California 8%, 15.6% and 16%. These statistics show the magnitude of the problem at

the national and state levels. In addition, the data indicate that the great majority of back diseases of this type are considered to be general diseases, unrelated to work, since they have been ruled as disability and not as permanent disability or occupational risk.

Nowadays, in jobs, they adopt a sitting posture due to the growth in the number of people using a computer. This posture is a risk factor for several diseases, such as diabetes, cardiovascular diseases and MSDs (Do Espírito et al. 2017). For a long time, it has been thought that office workers do not perform any physical effort and that being eight hours in front of a computer can cause some physical disorder or discomfort. The above has been studied evidencing the opposite, due to pain in the back, arms, eyesight, wrists, and neck, among others (Méndez and Sánchez, 2016) caused by the incorrect positioning of the computer equipment used about the furniture and equipment that integrates the physical workspace (Miller and Suther, 1983). This is probably because in our country there is no regulation regarding the ergonomic requirements of the workstation and work environment in offices and the conditions in which the computer equipment should be operated to optimize the physical and psychological health of the worker, ensuring their safety and productivity (Prado et al. 2014).

Therefore, according to García et al. (2013) MSDs have a very important impact in the workplace. Therefore, the evaluation and measurement of risk factors for this type of injury are of great importance, which is why this study aims to propose recommendations to help in the correction and prevention of MSDs due to the postural load of 12 secretaries of a public university. For this purpose, the postural assessment methods mentioned by López et al. (2014) as the most widely used, the Ovako Working Analysis System (OWAS) (Karhu et al. 1977), Rapid Entire Body Assessment (REBA) (Hignett and McAtamney, 2000), Rapid Office Strain Assessment (ROSA) (Snonne et al. 2012) and Occupational Repetitive Action (OCRA) Check List (Occhipinti and Colombini, 2005) were used.

The present article is presented in three sections. The first describes the method used to generate the results; the second section mentions the final comments, composed of the summary of results, conclusions and recommendations; the last section lists the references used in the article.

2 METHOD DESCRIPTION

First, the secretaries were informed of the possibility of participating in the study, mentioning the need to record them for one hour and take the corresponding anthropometric measurements. Out of 16 secretaries, 75% (12) agreed to participate

in the study. The video recording was made during peak activity hours to identify the work cycles and postures in the development of the task. To evaluate the postural load and the risk of MSDs in the secretaries, it was necessary to determine the degree of physical demand required by the activity and whether the physiological, biomechanical and anthropometric conditions of the work area or of the task itself were adequate or could cause risks to the worker. The MSD risk due to the postural load of the secretaries was evaluated first using the ergonomic methods OWAS, OCRA Check List, and REBA. Finally, the workstation was evaluated using the ROSA method. All the ergonomic methods were evaluated using recordings of each secretary, considering only the movements and postures with views in lateral position for the postural evaluation methods, as well as the measures and reach of the work tools for the ROSA method.

The tasks were divided into work cycles which were finally standardized into document review, computer use and telephone use. Finally, the videos were analyzed to be able to execute the evaluation of the ergonomic methods, which in the case of the evaluation of postures were OWAS, OCRA and REBA, using the equipment and the support of the software available on the Ergonauts website of the Polytechnic University of Valencia and the ROSA method with the use of the software available on the Lead Ergonomics© website.

3 FINAL COMMENTS

3.1 SUMMARY OF RESULTS

The work cycles were selected based on the job description and the task frequency. Finally, three cycles were determined: a) document review, which consists of reviewing documents whose activities refer to taking, reviewing, stamping and placing the document; b) use of the computer, which refers to capturing information on the computer, either by capturing a document or directly on the screen, the activities are: taking the document, capturing information and leaving the document; and c) use of the telephone, which refers to the task of picking up, answering/calling and hanging up. Fifty percent (6) of the secretaries performed all three cycles and the rest performed at least one. Figure 1 shows some postural examples of the secretaries performing the aforementioned cycles.

Figure 1. Work cycles a) document review, b) computer use, and c) telephone use.

3.2 OWAS METHOD

As shown in Table 1, 67% (8) of the secretaries in the use of the computer had a rating of 2 and 33% (4) had optimal values. In the case of telephone use, 71% (5 out of 7) require corrective and future actions and 29% (2) do not require action. The maximum values are mainly presented by poor back posture, such as bending and twisting the trunk or both. The codes for the posture of the arms in three of the secretaries present values 3 which corresponds to having one arm raised and the other low. Regarding the legs and the load lifted, there are no remarkable values since they are always seated and the loads do not reach 1 kg.

Table 1. Results of the risk level of the secretaries with the OWAS method assessment.

Secretary	Level of risk by cycle			Action required
	Document review	Computer use	Telephone use	
1	2	2	1	Corrective actions required in the near future
2	2	2	2	Corrective actions required in the near future
3	2	2	2	Corrective actions required in the near future
4	2	2	2	Corrective actions required in the near future
5	2	2	1	Corrective actions required in the near future
6	N/A	1	N/A	No action required
7	N/A	2	N/A	Corrective actions required in the near future

Secretary	Level of risk by cycle			Action required
	Document review	Computer use	Telephone use	
8	N/A	1	N/A	No action required
9	N/A	2	N/A	Corrective actions required in the near future
10	N/A	1	N/A	No action required
11	2	2	2	Corrective actions required in the near future
12	2	1	2	Corrective actions required in the near future

3.3 OCRA METHOD

The risk level for this method did not represent a significant risk, no case exceeds the Check List Index value <=5 except for secretary 10, which exceeded 5, although for all secretaries no action is required. The maximum values are presented mainly in the secretaries who carry out a single cycle (computer use), also, due to the similarity in the duration in the workplace and the frequency of the task in the work cycles, the results were very similar, as shown in Table 2.

Table 2. Results of the level of risk of the secretaries with the OCRA Check List method evaluation.

Secretary	Level of risk by cycle			Action required	Risk level of the work position			Action required
	Document review	Computer use	Telephone use		Document review	Computer use	Telephone use	
1	3.4	3.4	3.4	Optimal risk - no action required	4	4	4	Optimal risk - no action required
2	3.4	3.4	3.4	Optimal risk - no action required	4	4	4	Optimal risk - no action required
3	3	3	3	Optimal risk - no action required	4	4	4	Optimal risk - no action required
4	3.4	3.4	3.4	Optimal risk - no action required	4	4	4	Optimal risk - no action required
5	2.5	5.5	2.5	Optimal risk - no action required	4	7	4	Optimal risk - no action required
6	N/A	3.5	N/A	Optimal risk - no action required	N/A	7	N/A	Optimal risk - no action required
7	N/A	6	N/A	Optimal risk - no action required	N/A	7	N/A	Optimal risk - no action required

Secretary	Level of risk by cycle			Action required	Risk level of the work position			Action required
	Document review	Computer use	Telephone use		Document review	Computer use	Telephone use	
8	N/A	3.5	N/A	Optimal risk - no action required	N/A	7	N/A	Optimal risk - no action required
9	N/A	3.7	N/A	Optimal risk - no action required	N/A	4	N/A	Optimal risk - no action required
10	N/A	5.1	N/A	Risk	N/A	5.5	N/A	Optimal risk - no action required
11	3	2.6	0	Optimal risk - no action required	4.5	4.5	4.5	Optimal risk - no action required
12	2.6	2	0	Optimal risk - no action required	4	4	4	Optimal risk - no action required

3.4 REBA METHOD

Table 3 shows the results obtained from the evaluation with the REBA method by groups. The 38% (4) of the secretaries evaluated presented medium risk, while the remaining 62% (8) presented a low risk level, it can be observed that both wrist and arm are the parts analyzed with the highest score, suggesting the presence of repetitive movements and a poor distribution in the work areas.

Table 3. Results of the risk level of the secretaries with the REBA assessment method.

GROUP		**SECRETARY**			
		SECRETARY 1	**SECRETARY 2**	**SECRETARY 3**	**SECRETARY 4**
GROUP A	Neck	1	3	1	1
	Backstroke	1	1	2	1
	Legs	2	3	2	1
GROUP B	Arm	2	3	3	2
	Forearm	1	1	1	1
	Wrist	2	2	2	1
GROUP		**SECRETARY 5**	**SECRETARY 6**	**SECRETARY 7**	**SECRETARY 8**
GROUP A	Neck	1	2	1	1
	Backstroke	1	3	1	1
	Legs	2	1	2	2
GROUP B	Arm	2	1	2	2
	Forearm	1	1	1	1
	Wrist	3	2	3	3

GROUP		SECRETARY 9	SECRETARY 10	SECRETARY 11	SECRETARY 12
GROUP A	Neck	3	1	2	2
	Backstroke	1	2	3	2
	Legs	2	2	1	2
GROUP B	Arm	2	2	3	2
	Forearm	1	1	1	1
	Wrist	2	2	2	3

3.5 ROSA METHOD

Table 4 shows the final results of the secretaries' evaluations using the ROSA method. Scores of 5 or more are considered to indicate the presence of a risk for the worker, and further evaluation is pertinent, so 50% (6) of the secretaries present such a situation. The scores obtained are due to poor adjustment of the chair and poor positioning of the monitor.

Table 4. Results of the risk level of the secretaries with the ROSA method assessment.

Results of the ROSA evaluation									
Secretary	Chair	Monitor and Telephone	Keyboard and mouse	Final	Secretary	Chair	Monitor and Telephone	Keyboard and mouse	Final
1	5	4	4	5	7	4	2	3	4
2	4	5	3	5	8	3	3	2	3
3	4	7	2	7	9	3	6	3	6
4	5	4	3	5	10	4	3	2	4
5	4	4	3	4	11	4	3	3	4
6	5	5	4	5	12	5	3	3	5

4 CONCLUSIONS

The results obtained from the postural evaluations of the secretaries, it can be concluded that the OCRA Check List and REBA methods showed a low level of risk in the three cycles, however, with the results obtained from the OWAS and ROSA methods, there is a level of postural risk, due to the position of the back in the three cycles, the torsion of the trunk and the flexion of the neck, mainly in the use of the telephone, and the extension of the neck in the use of the computer. On the other hand, it is considered that the ROSA and OWAS methods for this study were more sensitive to the tasks performed in the secretaries' work cycles with respect to the OCRA Check List and REBA methods; however, they allowed inquiring about the risks associated with the secretaries' postures in these cycles. It is necessary to take corrective actions in

the three cycles to facilitate and improve the secretaries' postures in document review, computer use and telephone use.

5 SUGGESTION

To reduce the level of MSD risk in secretaries for computer use, telephone use and document review, it is recommended to modify the reach of the telephone, the posture when using the keyboard and mouse, the height of the desk and the conditions of the chair. Specifically, for cycle a) and b), secretaries need to place in the workspace a paper-rest with an adequate inclination (approximately 70º) to prevent the head from leaning forward and consequently flexing the back; and for cycle c), place cordless telephones to prevent arm extension/flexion and the elevation of one of the arms to hold the telephone. Likewise, the generation of training programs for workers to adjust their work implements according to their physical characteristics and comfort needs, in order to avoid musculoskeletal problems due to the conditions of their work (Montreuil et al. 2006). Additionally, it is advisable that the recordings made to workers to identify work cycles and postural analysis are made in a way that guarantees the performance of the task as close as possible to reality, because workers are aware that they are being photographed or videotaped and therefore do not adopt natural postures (Liebregts et al. 2016). In addition, it would be convenient to carry out other evaluations based on a longer recording time of the secretaries' tasks at their workstation, starting from a duration in the observation of the tasks and work cycles of at least 8 hours, in order to validate that the selected work cycles occur in the same way throughout a workday.

Finally, it is advisable to carry out a previous study regarding the health conditions of the participants, such as the application of questionnaires to investigate MSD problems of the secretaries (Akodu et al. 2015), in addition to analyzing the relationship between the pain presented in the various parts at risk with respect to the results obtained by the RULA method, or to have a clinical history of the employees involved (Zegarra and Andara 2012), who consulted their medical information; or if possible, to prepare a clinical history, relying on specialists in traumatology and occupational health (Vigil et al. 2007).

REFERENCES

Akodu, A., Akinfeleye, A., Atanda, L. and S. Giwa, "Work-related musculoskeletal disorders of the upper extremity with reference to working posture of secretaries", South African Journal of Occupational Theraphy, Vol. 45, No. 3, 2015, 16-22. DOI: http://dx.doi.org/10.17159/2310-3833/2015/v45n3/a4

CDC - NIOSH, "Work-Related Musculoskeletal Disorders (WMSDs) Evaluation Measures", 2016. Accessed online August 10, 2017. Internet address: https://www.cdc.gov/workplacehealthpromotion/health-strategies/musculoskeletal-disorders/evaluation-measures/index.html

Da Silva, G., Vilela, L., Saquy, P., Da Silva, G.P., Ferreira, B., Gilioli, T., De Sousa, L., Donizetti, V., Siéssere, S., Semprini, M., Rodrigues, N. and S. Hallak, "Analysis of endodontist posture utilizing cinemetry, Surface electromyography and ergonomic checklist", Brazilian Dental Journal, Vol. 25, No. 6, 2014, 508-518. DOI: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-64402014000600508&lng=en&tlng=en

Do Espírito, S.C. y R. Carrea. "Assessment of changes in spine curvatures and the sensations caused in the three different types of working seats", Revista Motriz, Vol. 2, No. 3, 2017. DOI: http://dx.doi.org/10.1590/s1980-6574201700030002

EU-OSHA European Agency for Safety and Health at Work, "Musculoskeletal disorders", 2015. Accessed August 7, 2017. Internet address: https://osha.europa.eu/es/themes/musculoskeletal-disorders

García-García, M., Sánchez, A., Camacho A. and R. Domingo, "Analysis of postural assessment methods in virtual simulation tools for manufacturing engineering", Revista Dyna, Vol. 80, No. 181, 2013, 5-15. ISSN 0012-7353.

Hignett, S. and L. McAtamney, "Rapid Entire Body Assessment (REBA)", Applied Ergonomics, Vol 31, 2000, 201-205. DOI: https://doi.org/10.1016/S0003-6870(99)00039-3

Karthu, O., Kansi, P. and I. Kuorinka, "Correcting working postures in industry: a practical method for análisis", Applied Ergonomics, Vol. 8, No. 4, 1977, 199-201. DOI: https://doi.org/10.1016/0003-6870(77)90164-8

Liebregts, J., Sonne, M. and J. Potvin, "Photograph-based ergonomic evaluations using the Rapid Office Strain Assessment (ROSA)", Applied Ergonomics, Vol. 52, 2016, 317-324. DOI: https://doi.org/10.1016/j.apergo.2015.07.028

López, B., González, E., Colunga, C. y E. Oliva, "Assessment of postural overload in workers: literature review", Revista Ciencia y Trabajo, Vol. 16, No. 50, 2014, 111-115. DOI: http://dx.doi.org/10.4067/S0718-2449201400020000

Méndez, Z. and M. Sánchez, "Study on the impact of ergonomic factors on productivity in a case study". Revista Jóvenes en la Ciencia, Vol. 2, No.1, 2016, 1689-1693.

Miller, W. and T. Suther, "Display Station Anthropometrics: Preferred Height and Angle Settings of CRT and Keyboard". Human Factors, 1983, 401-408.

Montreuil, S., Laflamme, L., Brisson, C. and C. Teiger, "Conditions that influence the elimination of postural constraints after office employees working with VDU have received ergonomics training". Work, Vol. 26, No. 2, 2006, 157-166.

Muñoz, M. and Y. Velasco, "Evaluation of work postures in the activity of archiving research project documents", Revista Universidad, Ciencias y Tecnología, Vol. 19, No. 76, 2015.

NIOSH, "Musculoskeletal Disorders and Workplace Factors", 2004. Accessed August 18, 2017. Internet address: https://www.cdc.gov/niosh/docs/97-141/default.html

Occhipinti, E. and D. Colombini. "The occupational repetitive action (OCRA) methods: OCRA index and OCRA checklist", Handbook of human factors and ergonomics methods, 2005.

OIT, "The prevention of ocupational diseases", 2013. Accessed August 18, 2017. Internet address: http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/publication/ wcms_208226.pdf

Prado, L., Ávila, R., Aceves, C. and E. González, “Working with computers. Recommendations for health, comfort and productivity”. Guadalajara: Universidad de Guadalajara, 2014. ISBN: 9786074500684.

STPS, “Statistics on occupational accidents and diseases 2016”, 2016. Accessed August 14, 2017. Internet address: http://autogestion.stps.gob.mx:8162/estadistica.aspx

Sonne, M., Villalta, D. and D. Andrews, “Development and evaluation of an office ergonomic risk checklist: ROSA – Rapid office strain assessment”, Vol 43, No. 1, 2012, 98-108. DOI: https://doi.org/10.1016/j.apergo.2011.03.008

Vigil, L., Gutiérrez, R., Cáceres, W., Collantes, H. and J. Beas “Occupational health in stevedoring work: workers in wholesale markets of Huancayo”, Revista Perú Med Exp Salud Pública, Vol.24, No. 4, 2007, 336-342.

Zegarra, R. and M. Andara, “Ergonomic risk analysis, using the REBA and RULA methods”, Revista Universidad, Ciencia y Tecnología UNEXPO Vicerrectorado Puerto Ordaz, 2015, 252-259.

SOBRE OS ORGANIZADORES

Jorge Rodrigues é economista. Licenciado, mestre e doutor em Gestão (ISCTE-IUL), com Agregação (UEuropeia). Mestre e pós-doutorado em Sociologia – ramo sociologia económica das organizações (FCSH NOVA). Professor coordenador com agregação no ISCAL – *Lisbon Accounting and Business School* / Instituto Politécnico de Lisboa, Portugal. Exerceu funções de direção em gestão (planeamento, marketing, comercial, finanças) no setor privado, público e cooperativo. Contabilista certificado. É investigador integrado no Instituto Jurídico Portucalense. Ensina e publica nas áreas de empresa familiar e família empresária, estratégia e finanças empresariais, gestão global, governabilidade organizacional, marketing, planeamento e controlo de gestão, responsabilidade social e ética das organizações.
https://orcid.org/0000-0001-7904-0061

Maria Amélia Marques, Doutora em Sociologia Económica das Organizações (ISEG/ULisboa), Mestre em Sistemas sócio-organizacionais da atividade económica - Sociologia da Empresa (ISEG/ULisboa), Licenciada (FPCE/UCoimbra), Professora Coordenadora no Departamento de Comportamento Organizacional e Gestão de Recursos Humanos (DCOGRH) da Escola Superior de Ciências Empresariais, do Instituto Politécnico de Setúbal (IPS/ESCE), Portugal. Membro efetivo do CICE/IPS – Centro Interdisciplinar em Ciências Empresariais da ESCE/IPS. Membro e Chairman (desde 2019 da ISO-TC260 HRM Portugal. Tem várias publicações sobre a problemática da gestão de recursos humanos, a conciliação da vida pessoal, familiar e profissional, os novos modelos de organização do trabalho, as motivações e expectativas dos estudantes Erasmus e a configuração e dinâmica das empresas familiares. Pertence a vários grupos de trabalho nas suas áreas de interesses.
https://orcid.org/0000-0002-7196-3838

ÍNDICE REMISSIVO

F

G

H

I

L

S

T

V

W