Revisión bibliográfica de los tipos de Ergonomía estudiadas en las publicaciones científicas localizadas en la Web of Science, 2019-2022

Chap Kau Kwan Chung
Universidad Americana
Asunción, Paraguay
wendy505@hotmail.com
https://orcid.org/0000-0002-5478-3659

Juan Antonio Moreno Mareco
Universidad Politécnica y Artística del Paraguay
Asunción, Paraguay
juan.moreno@upap.edu.py
https://orcid.org/0000-0001-7019-4427

Myrna Ruiz Díaz Vega
Universidad del Pacífico
Asunción, Paraguay
myrna.ruizdiaz@upacifico.edu.py
https://orcid.org/0000-0002-4844-8598

Miguel Ángel Alegre Brítez
Universidad Autónoma de Asunción
Asunción, Paraguay
malegre@uaa.edu.py
https://orcid.org/0000-0003-4265-9391

Jesús Antonio González Caballero
Universidad Americana
Asunción, Paraguay
jesusgonzalezpy@gmail.com
https://orcid.org/0000-0001-7587-5627

RESUMEN

El objetivo de la investigación es llevar a cabo una revisión bibliográfica de los tipos de Ergonomía estudiadas en las publicaciones científicas localizadas en la Web of Science, 2019-2022. Se optó por un enfoque cualitativo con complemento de lo cuantitativo, no experimental, transaccional y descriptivo. Se aplicó el muestreo intencional realizando la búsqueda con dos palabras clave: *egonomics* y *workplace* en Web of Science (WOS), enero de 2023. Los criterios de inclusión fueron: publicaciones en journals, acceso abierto, inglés y entre 2019-2022. Los criterios de exclusión fueron: acceso varios (Gold, Gold-Hybrid, Free to Read, Green Published, Green Accepted y Green Submitted), otros idiomas que no sea el inglés, artículos de revisión, resúmenes para conferencias y editorial. Se encontró un total de 77 artículos en la búsqueda y 8 fueron excluídos por no concordancia con el tema. Finalmente, 69 publicaciones sobre la Ergonomía en el lugar de trabajo han sido revisadas y el instrumento de recolección de datos estuvo constituido en 6 ítems (año de publicación, autor/es, título, tipos de ergonomía, revista y DOI). Los resultados más relevantes fueron: existe una mayor concentración de publicaciones en el año 2019 (28%); en las revistas Applied Ergonomics (29%) y Ergonomics (25%) y; la ergonomia Física (55%) es la más estudiada. Se concluye que los factores de riesgo ergonómicos ambientales, físicos, organizacionales y cognitivos de trabajo para cada tipo de trabajo deben tenerse en cuenta sistemáticamente mediante la evaluación regular de los empleados. Un entorno adecuado y amable reduce el impacto negativo sobre la salud del trabajador.

Palabras clave: Ergonomía; Revisión bibliográfica; Tipos de ergonomía

Bibliographic review of the types of Ergonomics studied in the scientific publications located on the Web of Science, 2019-2022

ABSTRACT

The objective of the research is to carry out a bibliographic review of the types of Ergonomics studied in the scientific publications located on the Web of Science, 2019-2022. We opted for a qualitative approach complemented by the quantitative, non-experimental, transactional and descriptive. Intentional sampling was applied by searching with two keywords: egonomics and workplace in Web of Science (WOS), January 2023. The inclusion criteria were: publications in journals, open access, English and between 2019-2022. The exclusion criteria were: various access (Gold, Gold-Hybrid, Free to Read, Green Published, Green Accepted and Green Submitted), languages other than English, review articles, abstracts for conferences and editorial. A total of 77 articles were found in the search and 8 were excluded for not matching the topic. Finally, 69 publications on Ergonomics in the workplace have been reviewed and the data collection instrument consisted of 6 items (year of publication, author/s, title, types of ergonomics, journal, and DOI). The most relevant results were: there is a higher concentration of publications in 2019 (28%); in the journals Applied Ergonomics (29%) and Ergonomics (25%) and; Physical ergonomics (55%) is the most studied. It is concluded that the environmental, physical, organizational and cognitive ergonomic risk factors of work for each type of work should be systematically taken into account through regular evaluation of employees. A suitable and friendly environment reduces the negative impact on the worker's health.

Keywords: Ergonomics; Bibliographic review; types of ergonomic

Artículo recibido 15 febrero 2023

Aceptado para publicación: 15 marzo 2023

INTRODUCCIÓN

La Revolución Industrial, iniciada en el siglo XVIII en Inglaterra y duró hasta principios del siglo XIX, introdujo grandes cambios y novedades, durante este período se desarrolló la mecanización de la agricultura y la industria textil. Cambios que tuvieron efectos económicos, sociales, culturales y laborales en todo el mundo. Además, aparecen nuevos problemas para los empresarios que giran en torno a la organización, funciones, gestión donde los trabajadores son protagonistas para la elevar la productividad sin fatigarlos, se da una interacción entre las máquinas y el hombre. Este nuevo escenario dió un paso relevante a la ergonomía en los últimos tiempos. El término ergonomía fue propuesto por primera vez por el naturalista polaco Woitej Yastembowsky en 1857 en su estudio Compendio de la ergonomía o de las ciencias del trabajo basada en leyes científicas objetivas de la naturaleza en la que decidieron crear un modelo de actividad laboral humana. Seguidamente, Frederick Taylor da los primeros pasos en el estudio de la actividad laboral con su obra Organización del trabajo científico, donde predijo que la eliminación de las personas que trabajan de manera lenta (denominados los soldados) asumiría profundos efectos en los costos de producción, mercado, desempleo y pobreza. En cualquier caso, el uso moderno del término se debe a Murrell, adoptado oficialmente tras la creación de la primera sociedad de ergonomía en 1949, con el objetivo de adaptar el trabajo a las personas (Torres y Rodríguez, 2021).

En este contexto existe varias definiciones de ergonomía, La Asociación Española de Ergonomía (2022), define la ergonomía como un conjunto de conocimientos de diferentes disciplinas científicas que se utilizan para adaptar productos, sistemas o entornos a las necesidades y características de las personas que los utilizan. La ergonomía es considerada una disciplina científica que brinda elementos para la evaluación de los riesgos ergonómicos que se presentan en el trabajo y que pueden prevenir las enfermedades y lesiones laborales, promoviendo así una mayor integración del personal y mejorando las condiciones de trabajo y de trabajo de los empleados (Agila, 2014) extendido a nivel mundial (Torres y Rodríguez, 2021). La ergonomía implica adaptar el entorno al usuario para favorecer su salud y obtener un rendimiento óptimo, de tal manera que el entorno del trabajador sea ergonómicamente mejor (Khattak, 2021). La

intensidad del trabajo y el tiempo de trabajo son dos extensiones en las que se pueden producir equivocaciones y lesiones (Bergsten et al,.2021).

Existen diferentes formas de clasificar la Ergonomía: Primero, según el objetivo de la intervención: *Ergonomía preventiva,* utilizada cuando en el sistema estudiado no existe en la realidad, caracterizada por una importante prevención ante determinados riesgos o inconvenientes, y; *Ergonomía correctiva,* trabaja con problemas específicos que surgen durante el trabajo. Segundo, según el enfoque de aplicación: *Microergonomía,*

reside en el diseño de puestos de trabajo con diferentes componentes de manera específica y; Macroergonomía, consiste en el diseño del sistema global de una organización. Tercero, según el ámbito de aplicación: *Ergonomía física*, ocupada de la adaptación del entorno físico a la persona, incluidos los materiales y productos utilizados para realizar las tareas: *Ergonomía cognitiva*, encargada de adaptar el entorno a las capacidades y necesidades psicológicas de las personas o usuarios; *Ergonomía geométrica u organizacional,* centrada en la relación entre el objeto y la organización, más que en el lugar de trabajo; *Ergonomía temporal,* analiza la relación entre el tiempo, la salud y el confort, desde lo físico como psicológico y; *Ergonomía ambiental*, enfocada en la relación entre el hombre y los factores ambientales, observando cómo influyen éstos sobre su estado de salud y comodidad (Hernández, 1996). Por consiguiente, la implementación de los principios ergonómicos en el lugar de trabajo requiere una buena transferencia de conocimientos con la participación de profesionales, trabajadores y directivos (AbdollahpourIcono y HelaliIcono, 2022) durante el proceso de análisis y diseño, para obtener sus puntos de vista como insumo para el desarrollo y solución al problema (Berlín et al., 2021; Neumann et al., 2012). Existe una gran cantidad de artículos científicos sobre los tipos de ergonomía que se han identificado durante los últimos tiempos. Esto requiere realizar una revisión bibliografía sobre los tipos de Ergonomía estudiadas en las publicaciones científicas.

METODOLOGÍA

En esta investigación se optó por una revisión bibliográfica sobre los tipos de Ergonomía laboral utilizadas en las publicaciones científicas, apuntando a un enfoque cualitativo con complemento

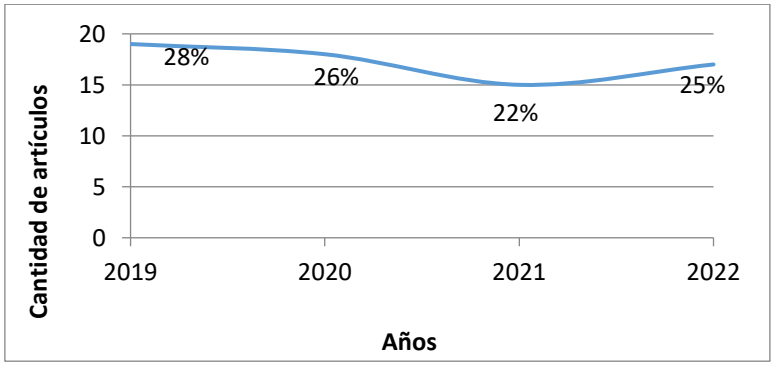
de lo cuantitativo, no experimental, transaccional y descriptivo. Se aplicó para la ocasión el muestreo intencional realizando la búsqueda con dos palabras clave: *egonomics* y *workplace* en la base de datos de Web of Science (WOS) en enero de 2023. Los criterios de inclusión fueron: artículos científicos publicados en journals, con acceso abierto, solo en inglés y durante el periodo de cuatro años (2019-2022). Los criterios de exclusión fueron: acceso varios (Gold, Gold-Hybrid, Free to Read, Green Published, Green Accepted y Green Submitted), otros idiomas que no sea el inglés, tipo de documentos relacionados a artículos de revisión, resúmenes para conferencias y editorial. El instrumento de recolección de datos estuvo constituido en 6 ítems (año de publicación, autor/es, título, tipos de ergonomía, revista y DOI). Se encontró un total de 77 artículos en la búsqueda. Una vez analizado los abstracts se excluyeron 8 publicaciones por no concordancia con el tema de la Ergonomía laboral. Finalmente, 69 publicaciones sobre la Ergonomía en el lugar de trabajo han sido revisadas para la presente pesquisa.

RESULTADOS

Después de haber analizado 69 artículos relacionado con la Ergonomía en el trabajo se presentan los resultados más relevantes.

En la Gráfico 1 se muestra las cantidades de publicaciones realizadas en el periodo 2019-2022. La frecuencia de trabajos publicados en revistas científicas relacionados con el tema de investigación es muy equitativa durante el periodo de análisis, donde la mayor concentración se encuentra en el año 2019 (28%) seguido del año 2020 (26%) y 2022 (25%).

Gráfico 1. *Cantidad de publicaciones entre 2019-2022*



Fuente: Elaboración propia (2023)

En la Tabla 1 se identifica las revistas con las cantidades de trabajos realizados durante el periodo 2019-2022. Se evidencia la existencia de 7 revistas que han publicado un total de 69 artículos científicos. Las revistas con mayores publicaciones sobre Ergonomía en lo laboral son el Applied Ergonomics (29%), Ergonomics (25%), International Journal of Industrial Ergonomics e Internacional Journal of Occupational Safety and Ergonomics (ambos con 14%).

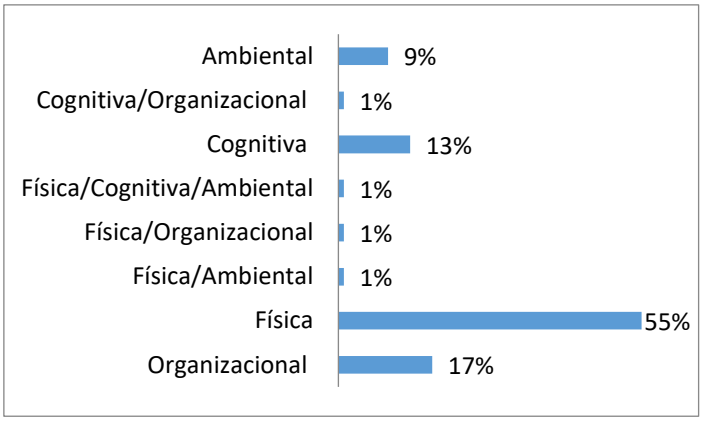
Tabla 1. *Cantidad de publicaciones realizadas en revistas*

#	REVISTA	2019	2020	2021	2022	TOTAL	%
1	APPLIED ERGONOMICS	3	5	4	8	20	29%
2	HUMAN FACTORS	2	1	2	0	5	7%
3	ERGONOMICS	8	3	1	5	17	25%
4	INTERNATIONAL JOURNAL OF INDUSTRIAL ERGONOMICS	3	5	1	1	10	14%
5	INTERNATIONAL JOURNAL OF OCCUPATIONAL SAFETY AND ERGONOMICS	0	2	7	1	10	14%
6	IISE TRANSACTIONS ON OCCUPATIONAL ERGONOMICS & HUMAN FACTORS	3	1	0	2	5	7%
7	HUMAN FACTORS AND ERGONOMICS IN MANUFACTURING & SERVICE INDUSTRIES	0	1	0	1	2	3%
TOTAL		**19**	**18**	**15**	**18**	**69**	**100%**

Fuente: Elaboración propia (2023)

En el Gráfico 2 se visualiza los tipos de Ergonomía utilizadas en los trabajos de investigación analizadas. La *Física* (55%) es la más estudiada entre los 4 tipos de Ergonomía existente seguido de la *Organizacional* (17%) y Cognitiva (13%).

Gráfico 2. *Tipos de Ergonomía usada en las publicaciones de forma porcentual*



Fuente: Elaboración propia (2023)

Tabla 2. *Caracterización de las publicaciones en WOS*

#	Año de publicación	Autor/es	Título	Tipo	Revista	DOI Link
1	2019	Koma, BS; Bergh, AM; Costa-Black, KM	Barriers to and facilitators for implementing an office ergonomics programme in a South African research organisation	Organizacional	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2018.09.003
2	2021	Khattak, SA	Role of ergonomics in re-designing job design in call centres	Organizacional	INTERNATIONAL JOURNAL OF OCCUPATIONAL SAFETY AND ERGONOMICS	http://dx.doi.org/10.1080/10803548.2019.1630111
3	2019	Greig, MA; Village, J; Dixon, SM; Salustri, FA; Neumann, WP	Assessing human factors and ergonomics capability in organisations - the Human Factors Integration Toolset	Organizacional	ERGONOMICS	http://dx.doi.org/10.1080/00140139.2019.1572228
4	2019	Jacobs, JV; Hettinger, LJ; Huang, YH; Jeffries, S; Lesch, MF; Simmons, LA; Verma, SK; Willetts, JL	Employee acceptance of wearable technology in the workplace	Física	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2019.03.003
5	2020	Galey, L; Audignon, S; Witschger, O; Bau, S; Judon, N; Lacourt, A; Garrigou, A	What does ergonomics have to do with nanotechnologies? A case study	Cognitiva	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2020.103116
6	2021	Kekkonen, P; Reiman, A; Vayrynen, S; Rajala, HK	Occupational safety and health in shared workplaces according to workplace inspection reports	Física Ambiental	INTERNATIONAL JOURNAL OF OCCUPATIONAL SAFETY AND ERGONOMICS	http://dx.doi.org/10.1080/10803548.2019.1600314
7	2022	Macdonald, W; Oakman, J	The problem with ergonomics injuries: What can ergonomists do?	Física	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2022.103774
8	2022	Abdollahpour, N; Helali, F	Implementing Practical Ergonomics Knowledge Transfer Using Ergonomic Checkpoints to Support the Participatory Ergonomics Process in an Industrially Developing Country	Organizacional	IISE TRANSACTIONS ON OCCUPATIONAL ERGONOMICS & HUMAN FACTORS	http://dx.doi.org/10.1080/24725838.2022.2054880
9	2019	Zetterberg, C; Heiden, M; Lindberg, P; Nylen, P; Hemphala, H	Reliability of a new risk assessment method for visual ergonomics	Física	INTERNATIONAL JOURNAL OF INDUSTRIAL ERGONOMICS	http://dx.doi.org/10.1016/j.ergon.2019.04.002
10	2021	Bortolini, R; Forcada, N	Regular and temporary occupants' perceptions of satisfaction in tertiary education buildings	Física	ERGONOMICS	http://dx.doi.org/10.1080/00140139.2021.1882706

#	Año de publicación	Autor/es	Título	Tipo	Revista	DOI Link
11	2019	Haslam, C; Kazi, A; Duncan, M; Clemes, S; Twumasi, R	Walking Works Wonders: a tailored workplace intervention evaluated over 24 months	Física	ERGONOMICS	http://dx.doi.org/10.1080/00140139.2018.1489982
12	2020	Haslam, C; Kazi, A; Duncan, M	Process evaluation of a tailored workplace intervention designed to promote sustainable working in a rapidly changing world	Organizacional	ERGONOMICS	http://dx.doi.org/10.1080/00140139.2019.1614212
13	2022	Haapakangas, A; Sirola, P; Ruohomaki, V	Understanding user behaviour in activity-based offices	Física	ERGONOMICS	http://dx.doi.org/10.1080/00140139.2022.2092654
14	2019	Heiden, M; Zetterberg, C; Lindberg, P; Nylen, P; Hemphala, H	Validity of a computer-based risk assessment method for visual ergonomics	Física	INTERNATIONAL JOURNAL OF INDUSTRIAL ERGONOMICS	http://dx.doi.org/10.1016/j.ergon.2019.05.006
15	2019	Sharma, PP; Mehta, RK; Pickens, A; Han, G; Benden, M	Sit-Stand Desk Software Can Now Monitor and Prompt Office Workers to Change Health Behaviors	Física	HUMAN FACTORS	http://dx.doi.org/10.1177/0018720818807043
16	2020	Hartwig, M; Wirth, M; Bonin, D	Insights about mental health aspects at intralogistics workplaces - A field study	Cognitiva	INTERNATIONAL JOURNAL OF INDUSTRIAL ERGONOMICS	http://dx.doi.org/10.1016/j.ergon.2020.102944
17	2021	Malinska, M; Bugajska, J; Bartuzi, P	Occupational and non-occupational risk factors for neck and lower back pain among computer workers: a cross-sectional study	Física	INTERNATIONAL JOURNAL OF OCCUPATIONAL SAFETY AND ERGONOMICS	http://dx.doi.org/10.1080/10803548.2021.1899650
18	2019	Womack, DM; Vuckovic, NN; Steege, LM; Eldredge, DH; Hribar, MR; Gorman, PN	Subtle cues: Qualitative elicitation of signs of capacity strain in the hospital workplace	Cognitiva	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2019.102893
19	2022	Goggins, KA; Tetzlaff, EJ; Young, WW; Godwin, AA	SARS-CoV-2 (Covid-19) workplace temperature screening: Seasonal concerns for thermal detection in northern regions	Ambiental	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2021.103576
20	2021	Bergsten, EL; Haapakangas, A; Larsson, J; Jahncke, H; Hallman, DM	Effects of relocation to activity-based workplaces on perceived productivity: Importance of change-oriented leadership	Ambiental	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2020.103348
21	2020	Heidarimoghadam, R; Mohammadfam, I; Babamiri, M; Soltanian, AR; Khotanlou, H; Sohrabi, MS	Study protocol and baseline results for a quasi-randomized control trial: An investigation on the effects of ergonomic interventions on work-related musculoskeletal disorders, quality of work-life and productivity in knowledge-based companies	Física Organizacional	INTERNATIONAL JOURNAL OF INDUSTRIAL ERGONOMICS	http://dx.doi.org/10.1016/j.ergon.2020.103030

#	Año de publicación	Autor/es	Título	Tipo	Revista	DOI Link
22	2020	Durniat, K	Development and psychometric properties of the Polish basic version of the SDM questionnaire for measuring bullying	Organizacional	INTERNATIONAL JOURNAL OF OCCUPATIONAL SAFETY AND ERGONOMICS	http://dx.doi.org/10.1080/10803548.2019.1617983
23	2021	Pleban, D; Radosz, J; Kryst, L; Surgiewicz, J	Assessment of working conditions in medical facilities due to noise	Ambiental	INTERNATIONAL JOURNAL OF OCCUPATIONAL SAFETY AND ERGONOMICS	http://dx.doi.org/10.1080/10803548.2021.1987692
24	2019	Gyi, D; Masson, A; Hignett, S	Plus size and obese workers: anthropometry estimates to promote inclusive design	Física	ERGONOMICS	http://dx.doi.org/10.1080/00140139.2019.1622791
25	2022	Berlin, C; Bligard, LO; Chafi, MB; Eriksson, S	Development of a stakeholder identification and analysis method for human factors integration in work system design interventions - Change Agent Infrastructure	Organizacional	HUMAN FACTORS AND ERGONOMICS IN MANUFACTURING & SERVICE INDUSTRIES	http://dx.doi.org/10.1002/hfm.20910
26	2019	Kazi, A; Haslam, C; Duncan, M; Clemes, S; Twumasi, R	Sedentary behaviour and health at work: an investigation of industrial sector, job role, gender and geographical differences	Física	ERGONOMICS	http://dx.doi.org/10.1080/00140139.2018.1489981
27	2021	Wascher, E; Reiser, J; Rinkenauer, G; Larra, M; Dreger, FA; Schneider, D; Karthaus, M; Getzmann, S; Gutberlet, M; Arnau, S	Neuroergonomics on the Go: An Evaluation of the Potential of Mobile EEG for Workplace Assessment and Design	Ambiental	HUMAN FACTORS	http://dx.doi.org/10.1177/00187208211007707
28	2021	Kropidlowska, P; Irzmanska, E; Zgorniak, P; Byczkowska, P	Evaluation of the mechanical strength and protective properties of polycarbonate toecaps subjected to repeated impacts simulating workplace conditions	Física	INTERNATIONAL JOURNAL OF OCCUPATIONAL SAFETY AND ERGONOMICS	http://dx.doi.org/10.1080/10803548.2020.1796295
29	2019	Richter, HO; Sundin, S; Long, J	Visually deficient working conditions and reduced work performance in office workers: Is it mediated by visual discomfort?	Física	INTERNATIONAL JOURNAL OF INDUSTRIAL ERGONOMICS	http://dx.doi.org/10.1016/j.ergon.2019.05.007
30	2022	Hoffmann, N; Prokop, G; Weidner, R	Methodologies for evaluating exoskeletons with industrial applications	Ambiental	ERGONOMICS	http://dx.doi.org/10.1080/00140139.2021.1970823
31	2020	Dennerlein, JT; Burke, L; Sabbath, EL; Williams, JAR; Peters, SE; Wallace, L; Karapanos, M; Sorensen, G	An Integrative Total Worker Health Framework for Keeping Workers Safe and Healthy During the COVID-19 Pandemic	Física Cognitiva Ambiental	HUMAN FACTORS	http://dx.doi.org/10.1177/0018720820932699

#	Año de publicación	Autor/es	Título	Tipo	Revista	DOI Link
32	2019	Jun, D; Johnston, V; McPhail, SM; O'Leary, S	Are Measures of Postural Behavior Using Motion Sensors in Seated Office Workers Reliable?	Física	HUMAN FACTORS	http://dx.doi.org/10.1177/0018720818821273
33	2021	Schmidt, KG; Holtermann, A; Jorgensen, MB; Svendsen, MJ; Rasmussen, CDN	Developing a practice and evidence-based guideline for occupational health and safety professionals to prevent and handle musculoskeletal pain in workplaces	Física	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2021.103520
34	2019	Kombeiz, O; Dietl, E	Light as a positive situational cue at work: Satisfaction with light relates to judgements of other's warmth and competence	Ambiental	ERGONOMICS	http://dx.doi.org/10.1080/00140139.2019.1608316
35	2020	Ipsen, C; Poulsen, S; Gish, L; Kirkegaard, ML	Continuous evaluation of participants' perceptions of impact: Applying a boundary object in organizational-level interventions	Cognitiva	HUMAN FACTORS AND ERGONOMICS IN MANUFACTURING & SERVICE INDUSTRIES	http://dx.doi.org/10.1002/hfm.20830
36	2020	Hellig, T; Johnen, L; Mertens, A; Nitsch, V; Brandl, C	Prediction model of the effect of postural interactions on muscular activity and perceived exertion	Física	ERGONOMICS	http://dx.doi.org/10.1080/00140139.2020.1740333
37	2019	Schwartz, B; Kapellusch, JM; Baca, A; Wessner, B	Medium-term effects of a two-desk sit/stand workstation on cognitive performance and workload for healthy people performing sedentary work: a secondary analysis of a randomised controlled trial	Física	ERGONOMICS	http://dx.doi.org/10.1080/00140139.2019.1577497
38	2022	Putz, S; Rick, V; Mertens, A; Nitsch, V	Using IoT devices for sensor-based monitoring of employees' mental workload: Investigating managers' expectations and concerns	Cognitiva	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2022.103739
39	2020	Baudendistel, ST; Grindstaff, TL; Rosen, AB; Yentes, JM	Bimanual load carriage alters sway patterns and step width	Física	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2019.103030
40	2020	Carter, S; Field, E; Oppermann, E; Brearley, M	The impact of perceived heat stress symptoms on work-related tasks and social factors: A cross-sectional survey of Australia's Monsoonal North	Cognitiva	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2019.102918
41	2021	Nayak, GK; Kim, E	Development of a fully automated RULA assessment system based on computer vision	Física	INTERNATIONAL JOURNAL OF INDUSTRIAL ERGONOMICS	http://dx.doi.org/10.1016/j.ergon.2021.103218

#	Año de publicación	Autor/es	Título	Tipo	Revista	DOI Link
42	2022	Tjosvoll, SO; Seeberg, TM; Fimland, MS; Wiggen, O; Jahren, SE	Classification of kneeling and squatting in workers wearing protective equipment: development and validation of a rule-based model using wireless triaxial accelerometers	Física	ERGONOMICS	http://dx.doi.org/10.1080/00140139.2022.2039410
43	2022	Johnen, L; Schaub, M; Mertens, A; Nitsch, V; Brandl, C	Can cumulative loading estimates be used to assess the collective occupational risk of MSD? Evaluation of calculation methods for spinal cumulative loading	Física	INTERNATIONAL JOURNAL OF INDUSTRIAL ERGONOMICS	http://dx.doi.org/10.1016/j.ergon.2022.103361
44	2022	Naweed, A; Bowditch, L; Trigg, J; Unsworth, C	Injury by design: A thematic networks and system dynamics analysis of work-related musculoskeletal disorders in tram drivers	Física	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2021.103644
45	2020	Bodin, J; Garlantezec, R; Costet, N; Descatha, A; Viel, JF; Roquelaure, Y	Shoulder pain among male industrial workers: Validation of a conceptual model in two independent French working populations	Física	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2020.103075
46	2022	Hawley, SJ; Hamilton-Wright, A; Fischer, SL	Detecting subject-specific fatigue-related changes in lifting kinematics using a machine learning approach	Física	ERGONOMICS	http://dx.doi.org/10.1080/00140139.2022.2061052
47	2022	Martinez, KB; Nazarahari, M; Rouhani, H	K-score: A novel scoring system to quantify fatigue-related ergonomic risk based on joint angle measurements via wearable inertial measurement units	Cognitiva	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2022.103757
48	2020	Antosz, P; Rembiasz, T; Verhagen, H	Employee shirking and overworking: modelling the unintended consequences of work organisation	Organizacional	ERGONOMICS	http://dx.doi.org/10.1080/00140139.2020.1744710
49	2022	Kox, J; Runhaar, J; Bierma-Zeinstra, S; Groenewoud, H; Bakker, E; Miedema, H; Roelofs, P	What sociodemographic and work characteristics are associated with musculoskeletal complaints in nursing students? A cross-sectional analysis of repeated measurements</p>	Física	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2022.103719
50	2021	Castellucci, HI; Viviani, C; Arezes, P; Molenbroek, JFM; Martinez, M; Aparici, V	Application of mismatch equations in dynamic seating designs	Física	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2020.103273
51	2020	Beschorner, KE; Siegel, JL; Hemler, SL; Sundaram, VH; Chanda, A; Iraqi, A; Haight, JM; Redfern, MS	An observational ergonomic tool for assessing the worn condition of slip-resistant shoes	Física	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2020.103140

#	Año de publicación	Autor/es	Título	Tipo	Revista	DOI Link
52	2020	Jachowicz, M; Owczarek, G	Analysis of selected mechanical parameters for foamed materials with non-Newtonian liquid characteristics in terms of their use in aspects of protective helmets	Física	INTERNATIONAL JOURNAL OF OCCUPATIONAL SAFETY AND ERGONOMICS	http://dx.doi.org/10.1080/10803548.2019.1667112
53	2021	Meyers, AR; Wurzelbacher, SJ; Krieg, EF; Ramsey, JG; Crombie, K; Christianson, AL; Luo, L; Burt, S	Work-Related Risk Factors for Rotator Cuff Syndrome in a Prospective Study of Manufacturing and Healthcare Workers	Física	HUMAN FACTORS	http://dx.doi.org/10.1177/00187208211022122
54	2021	Lastowiecka-Moras, E	Standing and sitting postures at work and symptoms of venous insufficiency - results from questionnaires and a Doppler ultrasound study	Física	INTERNATIONAL JOURNAL OF OCCUPATIONAL SAFETY AND ERGONOMICS	http://dx.doi.org/10.1080/10803548.2020.1834232
55	2019	Hensel, R; Keil, M	Subjective Evaluation of a Passive Industrial Exoskeleton for Lower-back Support: A Field Study in the Automotive Sector	Física	IISE TRANSACTIONS ON OCCUPATIONAL ERGONOMICS & HUMAN FACTORS	http://dx.doi.org/10.1080/24725838.2019.1573770
56	2021	Roossien, CC; Krops, LA; Wempe, JB; Verkerke, GJ; Reneman, MF	Can breathing gases be analyzed without a mouth mask? Proof-of-concept and concurrent validity of a newly developed design with a mask-less headset	Física	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2020.103266
57	2020	Steinhilber, B; Luger, T; Schwenkreis, P; Middeldorf, S; Bork, H; Mann, B; von Glinski, A; Schildhauer, TA; Weiler, S; Schmauder, M; Heinrich, K; Winter, G; Schnalke, G; Frener, P; Schick, R; Wischniewski, S; Jager, M	The use of exoskeletons in the occupational context for primary, secondary, and tertiary prevention of work-related musculoskeletal complaints	Física	IISE TRANSACTIONS ON OCCUPATIONAL ERGONOMICS & HUMAN FACTORS	http://dx.doi.org/10.1080/24725838.2020.1844344
58	2020	Van Acker, BB; Bombeke, K; Durnez, W; Parmentier, DD; Mateus, JC; Biondi, A; Saldien, J; Vlerick, P	Mobile pupillometry in manual assembly: A pilot study exploring the wearability and external validity of a renowned mental workload lab measure	Cognitiva	INTERNATIONAL JOURNAL OF INDUSTRIAL ERGONOMICS	http://dx.doi.org/10.1016/j.ergon.2019.102891
59	2021	Malinska, M; Bugajska, J	Assessment of the impact of lifestyle and psychosocial working conditions on older employees' work ability	Cognitiva Organizacional	INTERNATIONAL JOURNAL OF OCCUPATIONAL SAFETY AND ERGONOMICS	http://dx.doi.org/10.1080/10803548.2020.1829317

#	Año de publicación	Autor/es	Título	Tipo	Revista	DOI Link
60	2020	Castellucci, H; Viviani, C; Arezes, P; Molenbroek, JFM; Martinez, M; Aparici, V; Dianat, I	Applied anthropometry for common industrial settings design: Working and ideal manual handling heights	Física	INTERNATIONAL JOURNAL OF INDUSTRIAL ERGONOMICS	http://dx.doi.org/10.1016/j.ergon.2020.102963
61	2020	Roveda, L; Savani, L; Arlati, S; Dinon, T; Legnani, G; Tosatti, LM	Design methodology of an active back-support exoskeleton with adaptable backbone-based kinematics	Física	INTERNATIONAL JOURNAL OF INDUSTRIAL ERGONOMICS	http://dx.doi.org/10.1016/j.ergon.2020.102991
62	2019	Chanda, A; Reuter, A; Beschorner, KE	Vinyl Composite Tile Surrogate for Mechanical Slip Testing	Física	IISE TRANSACTIONS ON OCCUPATIONAL ERGONOMICS & HUMAN FACTORS	http://dx.doi.org/10.1080/24725838.2019.1637381
63	2019	Chafi, MB; Rolfo, L	Policies in Activity-based Flexible Offices - 'I am sloppy with clean-desking. We don't really know the rules.'	Organizacional	ERGONOMICS	http://dx.doi.org/10.1080/00140139.2018.1516805
64	2019	Weijs-Perree, M; Buck, L; Appel-Meulenbroek, R; Arentze, T	Location choices of face-to-face interactions in academic buildings: an experience sampling approach	Organizacional	ERGONOMICS	http://dx.doi.org/10.1080/00140139.2019.1660419
65	2022	Greenlee, ET; Funke, GJ; Hess, LJ; Vidulich, MA	Optimizing aid activation in adaptive and non-adaptive aiding systems: A framework for design and validation	Organizacional	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2021.103677
66	2022	Bergefurt, L; Appel-Meulenbroek, R; Maris, C; Arentze, T; Weijs-Perree, M; de Kort, Y	The influence of distractions of the home-work environment on mental health during the COVID-19 pandemic	Cognitiva	ERGONOMICS	http://dx.doi.org/10.1080/00140139.2022.2053590
67	2019	de Vries, A; Murphy, M; Konemann, R; Kingma, I; de Looze, M	The Amount of Support Provided by a Passive Arm Support Exoskeleton in a Range of Elevated Arm Postures	Física	IISE TRANSACTIONS ON OCCUPATIONAL ERGONOMICS & HUMAN FACTORS	http://dx.doi.org/10.1080/24725838.2019.1669736
68	2022	Fuentes, AG; Serrano, NMB; Lasheras, FS; Valverde, GF; Sanchez, AS	Work-related overexertion injuries in cleaning occupations: An exploration of the factors to predict the days of absence by means of machine learning methodologies	Física	APPLIED ERGONOMICS	http://dx.doi.org/10.1016/j.apergo.2022.103847
69	2022	Pacheco, PO; Coello-Montecel, D; Andrei, DM	Validation of the Spanish version of the Neal, Griffin and Hart safety behavior scale	Organizacional	INTERNATIONAL JOURNAL OF OCCUPATIONAL SAFETY AND ERGONOMICS	http://dx.doi.org/10.1080/10803548.2022.2131277

DISCUSIÓN

Después de haber realizado una revisión bibliográfica histórica en diferentes bases de datos utilizando el término "tipos de ergonomía" en inglés y con otros filtros complementarios como el periodo de tiempo (2019-2022), se ha podido identificar 69 publicaciones científicas sobre Ergonomía en 7 revistas, donde la frecuencia de trabajos publicados en revistas científicas relacionados con el tema de investigación es muy equitativa, la mayor concentración se encuentra en el año 2019 (28%) seguido del año 2020 (26%) y 2022 (25%). Por lo tanto, se demuestra en este aspecto que el tema de Ergonomía es bastante relevante conocerlo desde varios puntos de vistas, tanto para las organizaciones como para los colaboradores, quienes son los más afectados dependiendo de la situación laboral existente. Cabe destacar que los tipos de Ergonomía con mayor indagación fue la Física (55%) entre los 4 tipos de Ergonomía existente seguido de la Organizacional (17%) y Cognitiva (13%). Sin duda alguna, la preocupación física de las personas tiene un mayor peso que en las otras ergonomías, puesto que la salud física es un componente clave de éxitos para muchas empresas. La correcta posición de trabajo afectaría sin duda a la productividad empresarial. Finalmente, las revistas con mayores publicaciones sobre Ergonomía en lo laboral son el Applied Ergonomics (29%) y Ergonomics (25%), ambas revistas apuntan directamente al tema por lo que no es sorpresa que en ellas se encuentran localizadas un mayor porcentaje de publicaciones sobre la Ergonomía en sí.

CONCLUSIONES

Los factores de riesgo ergonómicos ambientales, físicos, organizacionales y cognitivos de trabajo para cada tipo de trabajo deben tenerse en cuenta sistemáticamente mediante la evaluación regular de los empleados. Un entorno adecuado y amable reduce el impacto negativo sobre la salud del trabajador. En cuanto a las producciones científicas sobre Ergonomía en lo laboral según journals analizados, sería conveniente aumentar la producción científica en dichas revistas y enfocadas quizás a otros tipos de ergonomía que no sea la física.

REFERENCIAS BIBLIOGRÁFICAS

Abdollahpour, N., & Helali, F. (2022). Implementing Practical Ergonomics Knowledge

Transfer Using Ergonomic Checkpoints to Support the Participatory Ergonomics Process in an Industrially Developing Country. *IISE Transactions on Occupational Ergonomics & Human Factors*, 10(2), 59-70. http://dx.doi.org/10.1080/24725838.2022.2054880

Agila-Palacios, Enmanuel, Colunga-Rodríguez, Cecilia, González-Muñoz, Elvia, & Delgado-García, Diemen. (2014). Síntomas Músculo-Esqueléticos en Trabajadores Operativos del Área de Mantenimiento de una Empresa Petrolera Ecuatoriana. *Ciencia & trabajo*, 16(51), 198-205. https://dx.doi.org/10.4067/S0718-24492014000300012

Antosz, P., Rembiasz, T., & Verhagen, H. (2020). Employee shirking and overworking: modelling the unintended consequences of work organization. *Ergonomics*, 63(8), 997-1009. https://doi.org/10.1080/00140139.2020.1744710

Asociación Internacional de Ergonomía (2022). *¿Qué es la ergonomía?* http://www.ergonomos.es/ergonomia.php

Baudendistel, S. T., Grindstaff, T. L., Rosen, A. B., & Yentes, J. M. (2020). Bimanual load carriage alters sway patterns and step width. *Applied Ergonomics*, 84. https://doi.org/10.1016/j.apergo.2019.103030

Bergsten, E. L., Haapakangas, A., Larsson, J., Jahncke, H., & Hallman, D. M. (2021). Effects of relocation to activity-based workplaces on perceived productivity: Importance of change-oriented leadership. *Applied Ergonomics*, 93. https://doi.org/10.1016/j.apergo.2020.103348

Berlin, C., Bligard, L. O., Chafi, M. B., & Eriksson, S. (2022). Development of a stakeholder identification and analysis method for human factors integration in work system design interventions - Change Agent Infrastructure. *Human Factors and Ergonomics in Manufacturing & Service Industries*, 32(1), 151-170. https://doi.org/10.1002/hfm.20910

Bergefurt, L., Appel-Meulenbroek, R., Maris, C., Arentze, T., Weijs-Perree, M., & de Kort,

Y. (2022). The influence of distractions of the home-work environment on mental health during the COVID-19 pandemic. *Ergonomics.* https://doi.org/10.1080/00140139.2022.2053590

Beschorner, K. E., Siegel, J. L., Hemler, S. L., Sundaram, V. H., Chanda, A., Iraqi, A., Haight, J. M., & Redfern, M. S. (2020). An observational ergonomic tool for assessing the worn condition of slip-resistant shoes. *Applied Ergonomics*, 88. https://doi.org/10.1016/j.apergo.2020.103140

Bodin, J., Garlantezec, R., Costet, N., Descatha, A., Viel, J. F., & Roquelaure, Y. (2020). Shoulder pain among male industrial workers: Validation of a conceptual model in two independent French working populations. *Applied Ergonomics*, 85. https://doi.org/10.1016/j.apergo.2020.103075

Bortolini, R., & Forcada, N. (2021) Regular and temporary occupants' perceptions of satisfaction in tertiary education buildings, *Ergonomics*, 64:7, 926-942, https://doi.org/10.1080/00140139.2021.1882706

Chanda, A; Reuter, A; Beschorner, KE. (2019). Vinyl Composite Tile Surrogate for Mechanical Slip Testing. *IISE Transactions on Occupational Ergonomics & Human Factors*, 7(2), 132-141. https://doi.org/10.1080/24725838.2019.1637381

Chafi, MB; Rolfo, L. (2019). Policies in Activity-based Flexible Offices -'I am sloppy with clean-desking. We don't really know the rules.'. *Ergonomics*, 62(1), 1-20. https://doi.org/10.1080/00140139.2018.1516805

Castellucci, H. I., Viviani, C., Arezes, P., Molenbroek, J. F. M., Martinez, M., & Aparici, V. (2021). Application of mismatch equations in dynamic seating designs. Applied *Ergonomics*, 90. https://doi.org/10.1016/j.apergo.2020.103273

Castellucci, H., Viviani, C., Arezes, P., Molenbroek, J. F. M., Martinez, M., Aparici, V., & Dianat, I. (2020). Applied anthropometry for common industrial settings design: Working and ideal manual handling heights. *International Journal of Industrial Ergonomics,* 78. https://doi.org/10.1016/j.ergon.2020.102963

Carter, S., Field, E., Oppermann, E., & Brearley, M. (2020). The impact of perceived heat

stress symptoms on work-related tasks and social factors: A cross-sectional survey of Australia's Monsoonal North. *Applied Ergonomics*, 82. https://doi.org/10.1016/j.apergo.2019.102918

de Vries, A., Murphy, M., Konemann, R., Kingma, I., & de Looze, M. (2019). The Amount of Support Provided by a Passive Arm Support Exoskeleton in a Range of Elevated Arm Postures. *IISE Transactions on Occupational Ergonomics & Human Factors.* https://doi.org/10.1080/24725838.2019.1669736

Dennerlein, J. T., Burke, L., Sabbath, E. L., Williams, J. A.R., Peters, S. E., Wallace, L., Karapanos, M., &; Sorensen, G. (2020). An Integrative Total Worker Health Framework for Keeping Workers Safe and Healthy During the COVID-19 Pandemic. *Human Factors*, 62(5), 689-696. https://doi.org/10.1177/0018720820932699

Durniat, K. (2020). Development and psychometric properties of the Polish basic version of the SDM questionnaire for measuring bullying. *International Journal of Occupational Safety and Ergonomics*, 26(3), 603-616. https://doi.org/10.1080/10803548.2019.1617983

Fuentes, A. G., Serrano, N. M. B., Lasheras, F. S., Valverde, G. F., & Sanchez, A. S. (2022). Work-related overexertion injuries in cleaning occupations: An exploration of the factors to predict the days of absence by means of machine learning methodologies. *Applied Ergonomics*, 105. https://doi.org/10.1016/j.apergo.2022.103847

Galey, L., Audignon, S., Witschger, O., Bau, S., Judon, N., Lacourt, A., & Garrigou, A. (2020). What does ergonomics have to do with nanotechnologies? A case study *Applied Ergonomics*, 87. https://doi.org/10.1016/j.apergo.2020.103116

Goggins, KA; Tetzlaff, EJ; Young, WW; Godwin, AA (2022). SARS-CoV-2 (Covid-19) workplace temperature screening: Seasonal concerns for thermal detection in northern regions. *Applied Ergonomics*, 98. https://doi.org/10.1016/j.apergo.2021.103576

Greenlee, E. T., Funke, G. J., Hess, L. J., & Vidulich, M. A. (2022). Optimizing aid activation in adaptive and non-adaptive aiding systems: A framework for design and validation. *Applied Ergonomics*, 101. https://doi.org/10.1016/j.apergo.2021.103677

Greig, M. A., Village, J., Dixon, S. M.; Salustri, F. A., & Neumann, W. P. (2019). Assessing human factors and ergonomics capability in organisations – the Human Factors Integration Toolset, *Ergonomics*, 62(10), 1254-1272. https://doi.org/10.1080/00140139.2019.1572228

Gyi, D., Masson, A., & Hignett, S. (2019). Plus size and obese workers: anthropometry estimates to promote inclusive design. *Ergonomics*, 62(9), 1234-1242. https://doi.org/10.1080/00140139.2019.1622791

Haapakangas, A., Sirola, P. & Ruohomäki, V. (2022. Understanding user behaviour in activity-based offices, *Ergonomics*. https://doi.org/10.1080/00140139.2022.2092654

Haslam, C., Kazi, A., Duncan, M., Clemes, S., & Twumasi, R. (2019). Walking Works Wonders: a tailored workplace intervention evaluated over 24 months. *Ergonomics*, 62(1), 31-41. https://doi.org/10.1080/00140139.2018.1489982

Haslam, C., Kazi, A., & Duncan, M. (2020). Process evaluation of a tailored workplace intervention designed to promote sustainable working in a rapidly changing world. *Ergonomics*, 63(3), 253-262. https://doi.org/10.1080/00140139.2019.1614212

Hartwig, M; Wirth, M; Bonin, D. (2020). Insights about mental health aspects at intralogistics workplaces - A field study. International Journal of Industrial *Ergonomics*, 76, https://doi.org/10.1016/j.ergon.2020.102944

Hawley, S. J., Hamilton-Wright, A., & Fischer, S. L. (2022). Detecting subject-specific fatigue-related changes in lifting kinematics using a machine learning approach. *Ergonomics*. https://doi.org/10.1080/00140139.2022.2061052

Heidarimoghadam, R., Mohammadfam, I., Babamiri, M., Soltanian, A. R., Khotanlou, H., & Sohrabi, M. S. (2020). Study protocol and baseline results for a quasi-randomized control trial: An investigation on the effects of ergonomic interventions on work-related musculoskeletal disorders, quality of work-life and productivity in knowledge-based companies. *International Journal of Industrial Ergonomics*, 80. https://doi.org/10.1016/j.ergon.2020.103030

Heiden, M., Zetterberg, C., Lindberg, P., Nylen, P., & Hemphala, H. (2019). Validity of a computer-based risk assessment method for visual ergonomics. International *Journal of Industrial Ergonomics*. 72. https://doi.org/10.1016/j.ergon.2019.05.006

Hellig, T., Johnen, L., Mertens, A., Nitsch, V., &; Brandl, C. (2020). Prediction model of the effect of postural interactions on muscular activity and perceived exertion. *Ergonomics*, 63(5), 593-606. https://doi.org/10.1080/00140139.2020.1740333

Hensel, R., & Keil, M. (2019). Subjective Evaluation of a Passive Industrial Exoskeleton for Lower-back Support: A Field Study in the Automotive Sector. *IISE Transactions on Occupational Ergonomics & Human Factors*, 7(3-4), 213-221. https://doi.org/10.1080/24725838.2019.1573770

Hernández, C. O. (1996). La ergonomía como ámbito de aplicación desde la psicología. *Papeles del Psicólogo*, (65). https://www.papelesdelpsicologo.es/resumen?pii=721

Hoffmann, N., Prokop, G., & Weidner, R. (2022). Methodologies for evaluating exoskeletons with industrial applications. *Ergonomics*, 65(2), 276-295. https://doi.org/10.1080/00140139.2021.1970823

Ipsen, C., Poulsen, S., Gish, L., & Kirkegaard, M. L. (2020). Continuous evaluation of participants' perceptions of impact: Applying a boundary object in organizational-level interventions. *Human Factors and Ergonomics in Manufacturing & Service Industries*, 30(3), 149-164. https://doi.org/10.1002/hfm.20830

Jachowicz, M., & Owczarek, G. (2020). Analysis of selected mechanical parameters for foamed materials with non-Newtonian liquid characteristics in terms of their use in aspects of protective helmets. *International Journal of Occupational Safety and Ergonomics*, 26(3), 617-623. https://doi.org/10.1080/10803548.2019.1667112

Jacobs, J. V., Hettinger, L. J., Huang, Y. H., Jeffries, S., Lesch, M. F., Simmons, L. A., Verma, S. K.,& Willetts, J. L. (2019). Employee acceptance of wearable technology in the workplace. *Applied Ergonomics*, 78, 148-156. https://doi.org/10.1016/j.apergo.2019.03.003

Johnen, L., Schaub, M., Mertens, A., Nitsch, V., & Brandl, C. (2022). Can cumulative

loading estimates be used to assess the collective occupational risk of MSD? Evaluation of calculation methods for spinal cumulative loading. *International Journal of Industrial Ergonomics*, 92. https://doi.org/10.1016/j.ergon.2022.103361

Jun, D., Johnston, V., McPhail, S. M., & O'Leary, S. (2019). Are Measures of Postural Behavior Using Motion Sensors in Seated Office Workers Reliable?. *Human Factors*, 61(7), 1141-1161. https://doi.org/10.1177/0018720818821273

Katarzyna Durniat (2020) Development and psychometric properties of the Polish basic version of the SDM questionnaire for measuring bullying, *International Journal of Occupational Safety and Ergonomics*, 26:3, 603-616. https://doi.org/10.1080/10803548.2019.1617983

Kazi, A; Haslam, C; Duncan, M; Clemes, S; Twumasi, R. (2019). Sedentary behaviour and health at work: an investigation of industrial sector, job role, gender and geographical differences. *Ergonomics*, 62(1), 21-30. https://doi.org/10.1080/00140139.2018.1489981

Kekkonen, P., Reiman, A., Vayrynen, S., & Rajala, H. K. (2021). Occupational safety and health in shared workplaces according to workplace inspection reports. *International Journal of Occupational Safety and Ergonomics*, 27(2), 504-516. https://doi.org/10.1080/10803548.2019.1600314

Khattak, S. A. (2021). Role of ergonomics in re-designing job design in call centres, *International Journal of Occupational Safety and Ergonomics*, 27:3, 784-793, https://doi.org/10.1080/10803548.2019.1630111

Koma, B. S., Bergh, A. M., & Costa-Black, K. M. (2019). Barriers to and facilitators for implementing an office ergonomics programme in a South African research organisation. *Applied Ergonomics*, 75, 83-90. https://doi.org/10.1016/j.apergo.2018.09.003

Kombeiz, O., & Dietl, E. (2019). Light as a positive situational cue at work: Satisfaction with light relates to judgements of other's warmth and competence. *Ergonomics*, 62(8), 995-1007. https://doi.org/10.1080/00140139.2019.1608316

Kox, J., Runhaar, J., Bierma-Zeinstra, S., Groenewoud, H., Bakker, E., Miedema, H., &

Roelofs, P. (2022). What sociodemographic and work characteristics are associated with musculoskeletal complaints in nursing students? A cross-sectional analysis of repeated measurements. *Applied Ergonomics*, 101. https://doi.org/10.1016/j.apergo.2022.103719

Kropidlowska, P; Irzmanska, E; Zgorniak, P; Byczkowska, P. (2021). Evaluation of the mechanical strength and protective properties of polycarbonate toecaps subjected to repeated impacts simulating workplace conditions. International *Journal of Occupational Safety and Ergonomics*, 27(3), 698-707. https://doi.org/10.1080/10803548.2020.1796295

Lastowiecka-Moras, E. (2021). Standing and sitting postures at work and symptoms of venous insufficiency - results from questionnaires and a Doppler ultrasound study. *International Journal of Occupational Safety and Ergonomics*, 27(4), 963-969. https://doi.org/10.1080/10803548.2020.1834232

Macdonald, W., & Oakman, J. (2022). The problem with ergonomics injuries: What can ergonomists do?. *Applied Ergonomics*, 103. https://doi.org/10.1016/j.apergo.2022.103774

Malinska, M., Bugajska, J., & Bartuzi, P. (2021). Occupational and non-occupational risk factors for neck and lower back pain among computer workers: a cross-sectional study. *International Journal of Occupational Safety and Ergonomics*, 27(4), 1108-1115. https://doi.org/10.1080/10803548.2021.1899650

Malinska, M., & Bugajska, J. (2021). Assessment of the impact of lifestyle and psychosocial working conditions on older employees' work ability. *International Journal of Occupational Safety And Ergonomics*, 27(3), 946-955. https://doi.org/10.1080/10803548.2020.1829317

Martinez, K. B., Nazarahari, M., & Rouhani, H. (2022). K-score: A novel scoring system to quantify fatigue-related ergonomic risk based on joint angle measurements via wearable inertial measurement units. *Applied Ergonomics*, 102. https://doi.org/10.1016/j.apergo.2022.103757

Meyers, A. R., Wurzelbacher, S. J., Krieg, E. F., Ramsey, J. G., Crombie, K., Christianson, A. L., Luo, L., & Burt, S. (2021). Work-Related Risk Factors for Rotator Cuff Syndrome in a Prospective Study of Manufacturing and Healthcare Workers. *Human Factors.* https://doi.org/10.1177/00187208211022122

Naweed, A; Bowditch, L; Trigg, J; Unsworth, C. (2022). Injury by design: A thematic networks and system dynamics analysis of work-related musculoskeletal disorders in tram drivers. *Applied Ergonomics*, 100. https://doi.org/10.1016/j.apergo.2021.103644

Nayak, G. K., & Kim, E. (2021). Development of a fully automated RULA assessment system based on computer vision. *International Journal of Industrial Ergonomics*, 86. https://doi.org/10.1016/j.ergon.2021.103218

Neumann, W. P., Dixon, S. M. y Ekman, M. (2012). Ergonomía investigación-acción I: pasar de la prueba de hipótesis al aprendizaje experiencial. *Ergonomía*, 55(10), 1127-1139. https://doi.org/10.1080/00140139.2012.700327

Pacheco, P. O., Coello-Montecel, D., & Andrei, D. M. (2022). Validation of the Spanish version of the Neal, Griffin and Hart safety behavior scale. *International Journal of Occupational Safety and Ergonomics.* https://doi.org/10.1080/10803548.2022.2131277

Pleban, D., Radosz, J., Kryst, L., & Surgiewicz, J. (2021). Assessment of working conditions in medical facilities due to noise. *International Journal of Occupational Safety and Ergonomics*, 27(4), 1199-1206. https://doi.org/10.1080/10803548.2021.1987692

Putz, S., Rick, V., Mertens, A., & Nitsch, V. (2022). Using IoT devices for sensor-based monitoring of employees' mental workload: Investigating managers' expectations and concerns. *Applied Ergonomics*, 102(11). https://doi.org/10.1016/j.apergo.2022.103739

Richter, H. O., Sundin, S., & Long, J. (2019). Visually deficient working conditions and reduced work performance in office workers: Is it mediated by visual discomfort?. *International Journal of Industrial Ergonomics*, 72, 128-136. https://doi.org/10.1016/j.ergon.2019.05.007

Roossien, C. C., Krops, L. A., Wempe, J. B., Verkerke, G. J., & Reneman, M. F. (2021). Can

breathing gases be analyzed without a mouth mask? Proof-of-concept and concurrent validity of a newly developed design with a mask-less headset. *Applied Ergonomics*, 90. https://doi.org/10.1016/j.apergo.2020.103266

Roveda, L., Savani, L., Arlati, S., Dinon, T., Legnani, G., & Tosatti, L .M. (2020). Design methodology of an active back-support exoskeleton with adaptable backbone-based kinematics. *International Journal of Industrial Ergonomics*, 79. https://doi.org/10.1016/j.ergon.2020.102991

Schmidt, K. G., Holtermann, A., Jorgensen, M. B., Svendsen, M. J., & Rasmussen, C. D. N. (2021). Developing a practice and evidence-based guideline for occupational health and safety professionals to prevent and handle musculoskeletal pain in workplaces. *Applied Ergonomics*, 97. https://doi.org/10.1016/j.apergo.2021.103520

Schwartz, B., Kapellusch, J. M., Baca, A., Wessner, B. (2019). Medium-term effects of a two-desk sit/stand workstation on cognitive performance and workload for healthy people performing sedentary work: a secondary analysis of a randomised controlled trial. *Ergonomics*, 62(6), 794-810. https://doi.org/10.1080/00140139.2019.1577497

Sharma, P. P., Mehta, R. K., Pickens, A., Han, G., & Benden, M. (2019). Sit-Stand Desk Software Can Now Monitor and Prompt Office Workers to Change Health Behaviors. *Human Factors*, 61(5). https://doi.org/10.1177/0018720818807043

Steinhilber, B., Luger, T., Schwenkreis, P., Middeldorf, S., Bork, H., Mann, B., Von Glinski, A., Schildhauer, T. A., Weiler, S., Schmauder, M., Heinrich, K., Winter, G., Schnalke, G., Frener, P., Schick, R., Wischniewski, S., & Jager, M. (2020). The use of exoskeletons in the occupational context for primary, secondary, and tertiary prevention of work-related musculoskeletal complaints. *IISE Transactions on Occupational Ergonomics & Human Factors*, 8(3), 132-144. https://doi.org/10.1080/24725838.2020.1844344

Tjosvoll, S. O., Seeberg, T. M., Fimland, M. S., Wiggen, O., & Jahren, S. E. (2022). Classification of kneeling and squatting in workers wearing protective equipment: development and validation of a rule-based model using wireless triaxial

accelerometers. *Ergonomics*, 65(10), 1410-1420. https://doi.org/10.1080/00140139.2022.2039410

Torres, Y., & Rodríguez, Y. (2021). Surgimiento y evolución de la ergonomía como disciplina: reflexiones sobre la escuela de los factores humanos y la escuela de la ergonomía de la actividad. *Revista Facultad Nacional de Salud Pública*, 39 (2). https://doi.org/10.17533/udea.rfnsp.e342868

Van Acker, B. B., Bombeke, K., Durnez, W., Parmentier, D. D., Mateus, J. C., Biondi, A., Saldien, J., & Vlerick, P. (2020). Mobile pupillometry in manual assembly: A pilot study exploring the wearability and external validity of a renowned mental workload lab measure. *International Journal of Industrial Ergonomics*, 75. https://doi.org/10.1016/j.ergon.2019.102891

Wascher, E; Reiser, J; Rinkenauer, G; Larra, M; Dreger, FA; Schneider, D; Karthaus, M; Getzmann, S; Gutberlet, M; Arnau, S. (2021). Neuroergonomics on the Go: An Evaluation of the Potential of Mobile EEG for Workplace Assessment and Design. *Human Factors* . https://doi.org/10.1177/00187208211007707

Weijs-Perree, M., Buck, L., Appel-Meulenbroek, R., & Arentze, T. (2019). Location choices of face-to-face interactions in academic buildings: an experience sampling approach. *Ergonomics*, 62(12), 1499-1514. https://doi.org/10.1080/00140139.2019.1660419

Womack, D. M., Vuckovic, N. N., Steege, L. M., Eldredge, D. H., Hribar, M. R., & Gorman, P. N. (2019). Subtle cues: Qualitative elicitation of signs of capacity strain in the hospital workplace. *Applied Ergonomics*, 81. https://doi.org/10.1016/j.apergo.2019.102893

Zetterberg, C., Heiden, M., Lindberg, P., Nylen, P., & Hemphala, H. (2019). Reliability of a new risk assessment method for visual ergonomics. *International Journal of Industrial Ergonomics*, 72, 71-79. https://dx.doi.org/10.1016/j.ergon.2019.04.002