

THE ROLE OF ERGONOMICS IN PREVENTING THE SPREAD OF THE COVID-19 VIRUS

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Abstract This paper aims to point out the potential of the application of ergonomics to prevent the transmission of the COVID-19 virus. It is a common belief that Medicine is an area whose achievements can be primarily or exclusively applied to the treatment of patients and the prevention of the spread of a pandemic. However, this is only partially true when it comes to virus transmission. What's more, Ergonomics potentially plays an equal or even a greater role in preventing the spread of infection. Unfortunately, even people who are professionally engaged in ergonomics were not sufficiently aware of these facts in the previous period, which was shown by the conducted analysis. It is necessary to emphasize that the role of ergonomics in preventing the spread of the virus derives from its definition as a science. It is known that Ergonomics is a science that studies the human - machine (object) - environment interaction. Therefore, by ergonomic studying all human - object and human - environment interactions during work or human activity, those interactions that are unsafe and can potentially lead to human contamination with the virus in his living and working environment can be identified. The application of such an ergonomic approach based on the analysis of the mentioned types of interactions can contribute to the prevention of the transmission of the Covid-19 virus, and thus reduce the harmful consequences that this virus has on the economy and society.

Keywords: Ergonomics; Covid-19; Virus transmission.

1. INTRODUCTION

If research were conducted among the population of people of the planet Earth with only one question - "Which field of science is in charge of solving the problem of spreading the COVID-19 virus?", almost 100% of respondents would give an unambiguous answer - Medicine. However, that is not a completely correct answer. There is at least one other scientific discipline that can play an important role in preventing the transmission of the Coronavirus. It's Ergonomics.

An additional problem is a fact that most people working in the field of Ergonomics are also not to a sufficient extent aware of the potential that Ergonomics possesses in preventing the spread of a pandemic. More will be said about that below. With this in mind, this paper aims to point out the role of Ergonomics in preventing the spread of the COVID-19 pandemic.

2. RELATIONSHIP OF OTHER SCIENCES TOWARD TO THE COVID-19 PANDEMIC

The Covid-19 virus pandemic has caused numerous disorders, not only in the field of health. The economy and society as a whole are feeling the various consequences of the pandemic. Other scientific disciplines try to analyze the changes and prevent the consequences of the pandemic. Some of the scientific disciplines that are most engaged in solving this problem are Economics, Biology, Law, Chemistry, Psychology, Sociology, etc. An exceptionally large number of scientific papers have

been published this year within the mentioned scientific disciplines, on the topic of the consequences and effects of the pandemic. However, it is difficult to find papers from these scientific disciplines that are directly oriented towards preventing the transmission of the virus in the population.

3. OVERVIEW OF PREVIOUS CONTRIBUTIONS OF ERGONOMICS RELATED TO THE COVID-19 PANDEMIC

Unfortunately, based on the insight into the contribution of ergonomics so far in connection with the Coronavirus pandemic, from a scientific and professional point of view, it can be concluded that its impact was not in line with the potential it has. Based on the review of papers published in renowned journals in the field of ergonomics, such as Ergonomics, International Journal of Industrial Ergonomics, Applied Ergonomics, Human Factors and Ergonomics in Manufacturing & Service Industries and International Journal of Occupational Safety and Ergonomics, it can be noticed that in the 2020 year, no paper has been published on the topic of Covid-19 virus. This data clearly indicates that the wider ergonomic scientific community in the previous period was not aware of the potential and role of ergonomics in connection with the pandemic of this virus.

However, there are also positive examples. In 2020, Work journal published a number of papers that addressed the topic of the Covid-19 virus. Papers [1-13] published in the mentioned journal dealt with various problems related to the Coronavirus. Topics related to the presence of the virus in the workplace, infection control in the work environment, therapeutic protocols, reduction of burnout in health care workers, preventive approach, work from home, the appearance of musculoskeletal discomfort, exercises that prevent MSD in new circumstances, as well as rehabilitation, were the subject of discussion in the said journal.

There are also other positive examples. The International Ergonomics Association (IEA) has organized a special section on the website of this organization, which is dedicated to Covid-19. The Federation of European Ergonomics Societies (FEES) organized a webinar on this topic. In addition, the national ergonomic associations of many countries have focused part of their activities on overcoming the pandemic problem.

4. CONSIDERATION OF THE POSSIBILITY OF THE CONTRIBUTION OF ERGONOMICS TO PREVENT THE SPREAD OF THE COVID-19 VIRUS IN THE NEXT PERIOD

Based on the insight into the previous contribution of Ergonomics in connection with the pandemic, one gets the impression that there is significant room for additional engagement of ergonomics in solving the problem of spreading the Covid-19 virus. There is an extremely large number of possibilities for the application of ergonomics in the analysis and prevention of the spread of the Coronavirus. However, in this regard, two main directions can be distinguished. Both of these directions derive from definitions of ergonomics. The definition of ergonomics given in [14] encompasses both essential aspects, ie. work and interaction. It follows that the two main directions of application of ergonomics to problems caused by the Covid-19 virus are:

1. Study of various phenomena and disorders caused by the virus, related to the performance of work activities, both at work and at home (new work procedures, changes in methodology, new forms of work organization ...)
2. Study of all forms of human interactions with objects intended for the performance of work activities, as well as human interactions with the environment, which can lead to the transmission of viruses from objects (tools, equipment ...) or the environment (air, fluids ...) on man.

The first direction of the application of ergonomics in the previous period was dominant. Almost all research conducted in the previous period in the field of ergonomics on the topic of the Covid-19 virus was related to the effects of this virus in the context of the impact on work. However, the other direction of the possible application of ergonomics was almost completely neglected.

5. CONCLUSION

It is generally known that ergonomics studies the human - machine - environment interaction, which is also observed from numerous definitions of ergonomics. However, in the case of the Covid-19 virus, we are interested in those human - object and human - environment interactions that can lead to human contamination with the virus. The emergence of the pandemic has caused the emergence of completely new circumstances, where operations that were routine now cease to be routine and require re-ergonomic assessment. Every work operation and human activity needs to be viewed through the context of interaction with objects and the environment, in order to determine whether the observed operation is safe for the worker, or requires a certain change, or even replacement with another operation. Workers are often not interested in doing such an analysis and often continue to do the job as before. However, the task of ergonomists is to review and analyze all interactions that are risky within work procedures that are applied, or may become risky under certain circumstances. This approach can provide a significant contribution to reducing the transmission of the COVID-19 virus and preserving the health of workers.

References

- [1] Jahangiri M., Cousins R. and Gharibi V., 2020, Let's Get Back to Work: Preventive Biological Cycle Management of COVID-19 in the Workplace, *Work*, Vol. 66 Iss. 4, pp. 713 – 716.
- [2] Arefi M. F., and Poursadeqiyani M., 2020, A Review of Studies on the COVID-19 Epidemic Crisis Disease with a Preventive Approach, *Work*, Vol. 66 Iss. 4, pp. 717 – 729.
- [3] Sharma K., Anand A., and Kumar Raj., 2020, The Role of Yoga in Working from Home During the COVID-19 Global Lockdown, *Work*, Vol. 66 Iss. 4, pp. 731 – 737.
- [4] Shariat A. et al., 2020, Novel Stretching and Strength-building Exercise Recommendations for Computer-based Workers During the COVID-19 Quarantine, *Work*, Vol. 66 Iss. 4, pp. 739 – 749.
- [5] Memari A., Shariat A., and Anastasio A. T., 2020, Rising Incidence of Musculoskeletal Discomfort in the Wake of the COVID-19 Crisis, *Work*, Vol. 66 Iss. 4, pp. 751 – 753.
- [6] Siddiqui A. A. et al., 2020, Knowledge and Practice Regarding Prevention of COVID-19 Among the Saudi Arabian Population, *Work*, Vol. 66 Iss. 4, pp. 767 – 775.
- [7] Soheili S., Shariat A., and Anastasio A. T., 2020, Modification of Existing Occupational Therapeutic Protocols in Response to the “new Normal” after COVID-19: Letter to the Editor, *Work*, Vol. 66 Iss. 3, pp. 477 – 478.

IETI Transactions on Ergonomics and Safety

<http://ietl.net/TES/>

2020, Volume 4, Issue 1, 1-4, DOI: 10.6722/TES.202010_4(1).0001

- [8] Irmak R., 2020, The Most Cited and Co-cited COVID-19 Articles: Knowledge Base for Rehabilitation Team Members, *Work*, Vol. 66 Iss. 3, pp. 479 – 489.
- [9] Paraskevopoulos E., and Papandreou M., 2020, Systematic Infection Control in Greek Physiotherapy Practices During the COVID-19 Pandemic, *Work*, Vol. 66 Iss. 2, pp. 367 – 370.
- [10] Lopez-Leon S., Forero D. A., and Ruiz-Díaz P., 2020, Recommendations for Working from Home During the COVID-19 Pandemic (and Beyond), *Work*, Vol. 66 Iss. 2, pp. 371 – 375.
- [11] Omidi L., Moradi G., and Mostofi S. N., 2020, Risk of COVID-19 Infection in Workplace Settings and the Use of Personal Protective Equipment, *Work*, Vol. 66 Iss. 2, pp. 377 – 378.
- [12] Babamiri M., Alipour N., and Heidarimoghadam R., 2020, Research on Reducing Burnout in Health Care Workers in Critical Situations Such as the COVID-19 Outbreak, *Work*, Vol. 66 Iss. 2, pp. 379 – 380.
- [13] Shariat A., Cleland J. A., and Hakakzadeh A., 2020, Home-based Exercises During the COVID-19 Quarantine Situation for Office Workers: A Commentary, *Work*, Vol. 66 Iss. 2, pp. 381 – 382.
- [14] Zunjic A., 2017, A new definition of ergonomics, *IETI Transactions on Ergonomics and Safety*, Vol.1 Iss.1, pp. 1-6.