

# Analysis of Workers' Physical and Mental Complaints in Conducting Online Meetings in the New Normal Era

**Deni Saputra**

Furniture Industry Business Management Study Program  
Furniture and Wood Processing Industry Polytechnic  
Kendal, Indonesia  
[deni-saputra@kemenperin.go.id](mailto:deni-saputra@kemenperin.go.id)

**Merisha Hastarina**

Industrial Engineering Study Program  
University of Muhammadiyah Palembang  
Palembang, Indonesia  
[icha3005@gmail.com](mailto:icha3005@gmail.com)

## Abstract

Cultural change is the word that most deserves to be pinned in 2020 until now. It is not only happening in the world. It also happens in Indonesia. The work culture that usually works from the office is now changing to working from home. This cultural change has a positive impact and has a negative impact, both physically and mentally, due to behavior during online meetings. The survey results on office work, both in the world of education and other general office jobs, show that 90% of workers use laptops/computers and smartphones in conducting online meetings. The purpose of this study is to identify the behavior of workers when attending online meetings. In this study, the authors measure the level of physical muscle complaints (MSD and visual fatigue), mental (stress) and provide recommendations to minimize the negative impacts that occur. Data collection is done by conducting an online survey of workers who work as office workers, teachers, and lecturers spread from several workplaces throughout Indonesia, totaling 124 people with a composition of 48 women and 76 men. As many as 80% of people spend more time working at home than working in the office. Measurement MSD was measured using the Nordic Body Map method, while visual fatigue was evaluated referring to the symptoms presented in previous studies. The survey results showed that most MSD complaints occurred in the upper neck (72.58%) and waist (68.55%). A total of 63.2% of workers experienced visual fatigue, with the majority of the symptoms being dry eyes (54.03%) and itchy eyes (53.23%). In addition, employees also experienced mental complaints, with moderate stress levels of 66.1% and 9.7% for high stress.

## Keywords

Online, MSD, Visual Fatigue and Stress

## 1. Introduction

Cultural change is the most certain thing in the Covid-19 Pandemic. The COVID-19 pandemic has changed the lives of people around the world in all aspects. Both in the aspects of work, education, shopping, social, and health. Based on the Decree of the Minister of Health of the Republic of Indonesia Number HK.01.07/Menkes/328/2020 concerning Guidelines for Prevention and Control of Corona Virus Disease 2019 (Covid-19) in Office and Industrial Workplaces in Supporting Business Continuity in Pandemic Situations, that regulates prevention and control Covid-19 in the work environment, one of which is by limiting travel activities, physical distancing, working from home, and so others. It has a genuine impact on changes in activities carried out by the community, especially in Indonesia. Work has different rules, such as working from home, washing hands, and keeping a distance before entering the office. Plus, all meetings that were usually held face-to-face have now been replaced with online meetings.

Online meetings or online both regular activities and work activities have become a lifestyle for today's society. Not infrequently, we see advertisements on social media and even on websites where seminars, workshops, and even meetings are held online. Currently, many applications provide online meeting services, among which the most famous

are Zoom, G-Meet, WebEx, and others. In the use of video conferencing applications in Indonesia, as many as five platforms during February and March 2020 showed a significant increase based on press releases of Statqo analytics (2020), as shown in Table 1.

Table 1. Trends in active users of video conference applications

No.	Feb-5 Mar	6-12 Mar	13-19 Mar	20-26 Mar
Zoom	8714	8985	9103	257853
Google Meets	1448	1554	7917	10454
Skype	60614	60641	65857	71115
Cisco Webex	3983	4123	8257	8748
Goto Meeting	479	505	696	977

While it is based on a data press release of fortune business insight (2020) world of video conferencing industry market share has reached 34.1% since 2018. In addition, the average time spent by Indonesia in conducting online chat or video conference in august 2020 is more than 39% of people spend more than 1-2 hours and more than 18% of people who spend up to 2-4 hours. In this case, only 17.2% of Indonesians do not use it at all, Statista (2020). More details can be seen in Figure 1.

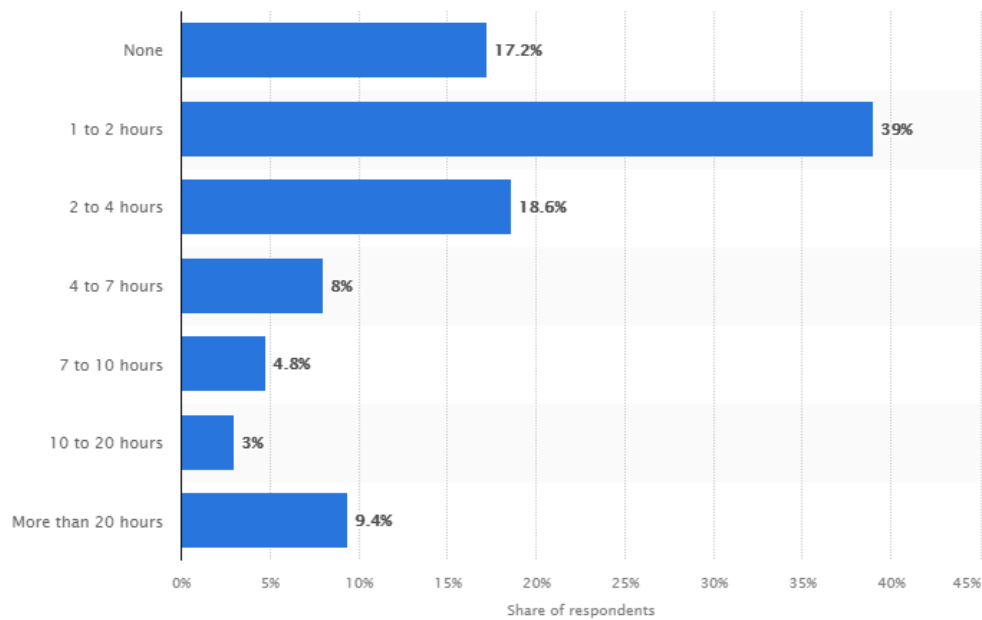


Figure 1. Time consumed by the Indonesian people in online chat/video conference

These cultural changes and activities affect and impact employees/students or anyone who does it for a long time. As in previous studies, it was shown in the physical aspect that doing computer work for too long can result in musculoskeletal disorders in the shoulders, arms, hands (Edlink, 2012 as Bodin et al., 2019); and headaches (Lima and Coelho, 2018). Plus, eyes that are constantly looking at a computer or laptop monitor can cause visual problems such as having ocular symptoms: watery, dry, itchy, and sore eyes; visual symptoms: blurred eyes and systemic symptoms: headache, shoulder pain, neck pain, and back pain (Shrestha et al., 2011). Furthermore, Bodin et al. (2019) compared 4 (four) muscle activities on PC and smartphone use, and The results show that the activity of the right and left trapezius muscles and the extensor digitorium in the right arm is higher in PC users than smartphone users. In contrast, the activity of m. dorsal interossei on the right hand in smartphone users is higher than in PC users. Meanwhile, from the mental aspect, high-frequency smartphone use can cause sleep disturbance and depression, and

smartphone addiction (Haug et al., 2015). *Smartphone addiction* is a non-chemical behavioral addiction involving human-machine interaction such as gambling disorder or internet gaming disorder (Haug et al., 2015). In response to this, special considerations need to be made regarding the attitudes and conditions of workers in conducting lectures, seminars, workshops, and online meetings that are different from activities that are carried out offline. For example, the gadget/device used to carry out these activities, whether using a computer/laptop or using a smartphone, the position in carrying out these online activities, whether it is done by sitting or stretched out on a chair or a bed if the activity is done at home (Work From Home).

### 1.1 Objective

The aim of this research is

- To measure the physical and mental complaints experienced by Workers in conducting online meetings in the new normal era.
- To provide considerations related to the attitudes and conditions of workers in carrying out work activities carried out online.

### 2. Literature Review

Ergonomics experts often use the Nordic Body Map method to assess musculoskeletal disorders (MSD) and have good validity and reliability (Tarwaka, 2014). This method was first introduced by Kuorinka et al. (1987), which was later validated by Dickinson et al. (1992) and Chaffin and Anderson (1991) as written in Helander (1995). The Nordic Body Map questionnaire is the most frequently used questionnaire to determine workers' discomfort, and this questionnaire is most often used because it is standardized and neatly arranged. (Kroemer, 1994). This questionnaire is filled out with the level of complaints from each of the 28 segments of the human body, as shown in Figure 2.

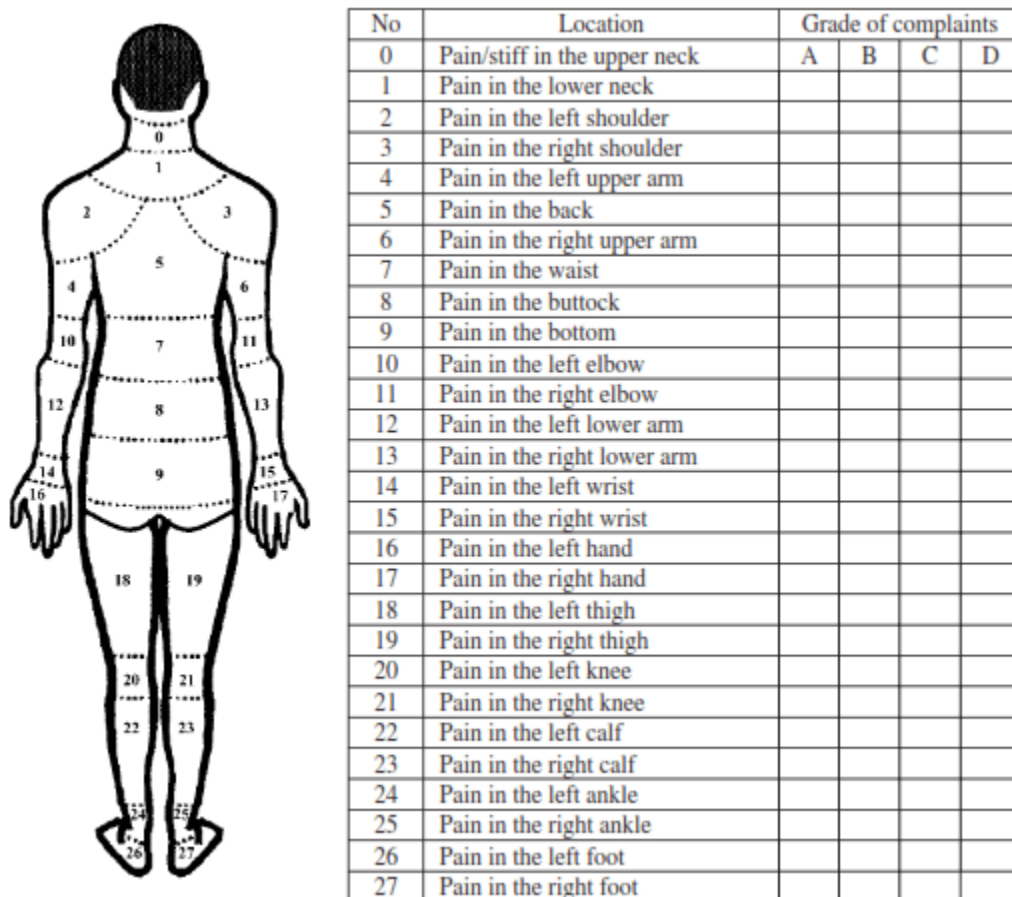


Figure 2. Nordic body map

Furthermore, measuring the mental complaints experienced by workers can be measured by measuring stress levels. Stress is a normal psychophysiological response to events resulting in the sense of threat, sadness, Dysphoria, and imbalance in people (Shalev, Yehuda, & McFarlane, 2000). *Stress* is a situation in which an individual is forced to act and cannot bear the received mental tension. In other words, stress means the readjustment of individual with new situations and conditions. Whenever a change occurs in life, individual is confronting with stress (Behnoudi 2005) or stress is bodily response to any demand. Stress could be caused by either good or bad experiences (Kumari et al., 2009). Perceived Stress Scale (PSS) is an instrument to measure a person’s stress level developed by Cohen et al. (1983). It is a self-reported questionnaire that was designed to measure “the degree to which individuals appraise situations in their lives as stressful” (Cohen et al. al., 1983, p. 385). PSS is a psychological method that is widely used to measure stress perception. The advantage of this method is that the questions are easy to understand, and the response/ answer choices are simple. The questions are general, and respondents are asked to fill in a score according to the feelings they experienced a month ago. The questions on the PSS can be seen in Table 2.

Table 2. PSS questionnaire

No.	Question
1	In the last month, how often have you been upset because of something that happened unexpectedly?
2	In the last month, how often have you felt that you were unable to control the important things in your life?
3	In the last month, how often have you felt nervous and “stressed”?
4	In the last month, how often have you felt confident about your ability to handle your personal problems? .
5	In the last month, how often have you felt that things were going your way?
6	In the last month, how often have you found that you could not cope with all the things that you had to do?
7	In the last month, how often have you been able to control irritations in your life?
8	In the last month, how often have you felt that you were on top of things?
9	In the last month, how often have you been angered because of things that were outside of your control?
10	In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

PSS has three versions. Initially, this instrument had 14 items (Cohen et al., 1983), then it was expanded to 10 items, and finally, it was also expanded to 4 items but required telephone interviews, Cohen & Williamson (1988). Based on E.-H. Lee PSS (2012) research, PSS with ten items is more recommended than PSS using 14 items or four items. So in this study using ten assessment items.

### 3. Methods

This study using an online questionnaire. Question - question on the questionnaire is divided into three sections: demographics, physical complaints (musculoskeletal disorder (MSD) and visual fatigue ), and the level of stress. MSD complaints were obtained using the Nordic Body Map questionnaire, while stress levels were obtained using the PSS questionnaire. In the Nordic Body Map questionnaire, the score used is 0 to 4 with the following conditions: Score 0 = no complaints/pain in the muscles or no pain felt by workers while doing work (no pain); score 1 = feel a minor complaint or pain in the muscles, but it has not interfered with work (slightly sick); score 2 = respondent feels a complaint/pain or pain in the muscles and has interfered with work, but the pain immediately disappears after taking a break from work (sick); score 3 = respondents feel very sick or very sore in the muscles and the pain does not go away even though it has been resting for a long time or even muscle pain relievers are needed (very painful). While the PSS questionnaire measures stress through 10 (ten) questions filled in on a scale of 0 to 4 where 0 means “never,” 1 “seldom,” 2 “sometimes,” 3 “often” and 4 “often”. Then the total score is calculated by adding up the selected

scales, but previously, the scales were changed with the following conditions: scale 0=4, 1=3, 2=2, 3=1, and 4=0. The total score is in the range of 0 to 40. Stress levels are grouped with the provisions of the total score as follows:

- Score 0-13 including Low Stress
- Score 14-26 including Moderate Stress
- Score 27-40 including High Stress

#### 4. Data Collection

In this study, an online survey was conducted to collect data randomly distributed to social media groups. From the distribution of respondents, various backgrounds of respondents with the number of respondents who filled out 124 workers with a composition of 48 female respondents and 76 male respondents. As many as 80% of people spend more time working at home (WFH) than working in the office. Workers from various sectors, service sector, manufacturing, and education.

#### 5. Result and Discussion

##### Visual Fatigue Complaint

Based on results surveys that have been done, 63.2 % of respondents experiencing visual fatigue and for 19:35% had one complaint, and the majority felt the complaint up to 3 to 4 complaints in visual fatigue. In detail can be seen in Tables 3 and 4.

Table 3. Distribution of pain in visual fatigue

Type of Pain	Number of Respondents	%
Eyes hurt	30	24.19
Dry eyes	67	54.03
Blurred eyes	39	31.45
Itchy eyes	66	53.23
Watery eyes	33	26.61
Headache	29	23.39

In table 6, it can be seen that the type of pain most often experienced by respondents is the dry eye with a percentage of 54.03 %. Itchy eyes then follow it with a percentage of 53.23 %. At the same time, the least is headaches, with a percentage of 23.39 % and sore eyes 24.19%. It can be seen that dry and itchy eyes dominate the visual fatigue caused by online meeting activities.

Table 4. Number of complaints of visual fatigue

Number of Complaints	Number of Respondents	%
1	7	5.65
2	6	4.84
3	28	22.58
4	29	23.39
5	9	7.26

While in table 7, it can be seen that the majority of respondents feel more than one complaint. It can be seen that the number of complaints 1 is only 5.65% and the majority are 3 and 4 the number of complaints. Only 45 people, or 36.2%, did not experience any complaints during the online meeting.

From several literature studies, Stella (2007) in Shrestha et al. (2011) states that eye discomfort or eye pain symptoms will increase if someone sees VDT more than 8 hours per day.

**MSD Complaints**

In this MSD complaint as Table 5, most respondents felt complaints in the upper neck, with 72.38% of respondents feeling pain in that area. Furthermore, the area that respondents most often complained about during online meetings was the waist area, with a total of 68.55%. When viewed from the table, it can be seen that the right side of the body area dominates the complaints, such as pain in the right hand by 58.06% and pain in the right wrist by 54.03% compared to the left side of the body such as pain in the left hand 9.68% and pain in the left wrist by 12.10%. The right limb may be used more by respondents in operating computers/gadgets in online meetings.

Table 5. Distribution of the location of complaints on the body

Location	Total
[0] Pain/stiff in the upper neck	72.58%
[1] Pain in the lower neck	58.87%
[2] Pain in the left shoulder	24.19%
[3] Pain in the right shoulder	52.42%
[5] Pain in the back	53.23%
[6] Pain in the right upper arm	24.19%
[7] Pain in the waist	68.55%
[8] Pain in the buttock	51.61%
[9] Pain in the bottom	49.19%
[14] Pain in the left wrist	12.10%
[15] Pain in the right wrist	54.03%
[16] pain in the left hand	9.68%
[17] pain in the right hand	58.06%

In more detail as Figure 3, the level of respondent’s complaints that they experienced during this online meeting showed that the location of the complaints most experienced by respondents was the location of pain/stiff in the upper neck and pain in the waist. At the same time, most of the level is two or slightly sick for all the complaints experienced. The highest score of 2 was felt in pain/stiff in the upper neck and pain in the waist, while the highest level of 3 was also felt in pain/stiff in the upper neck and pain in the waist. While the highest level felt was a pain in the lower neck, with six respondents feeling it, and Pain/stiff in the upper neck with three people. If you look again at the picture, you can see that most of the middle body (waist up) experiences pain during online meetings. It may be because the chairs/tables used by the respondents are not as ideal as those used in the office.

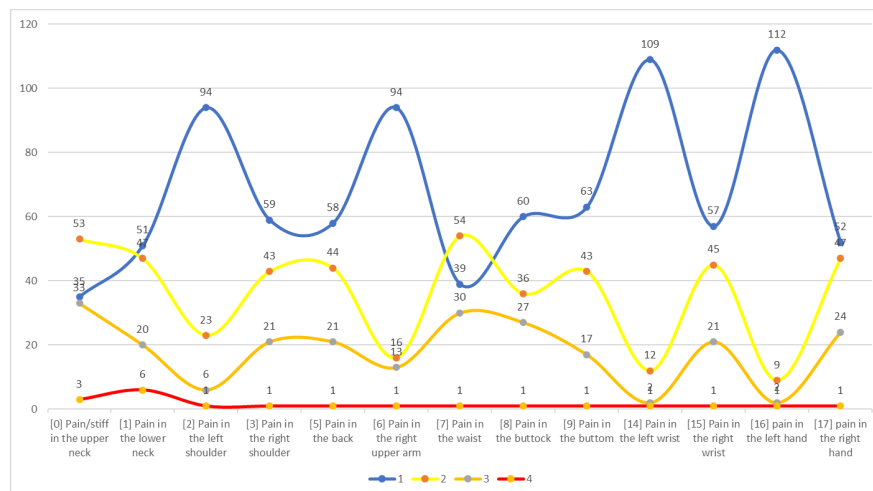


Figure 3. MSD complaint rate by NBM

### Stress level

Furthermore, an assessment of the level of stress experienced by workers during online meetings, Based on the Figure 4, the results of this study indicate that the majority of respondents feel stress with a moderate level of 66.1%, and for low stress, it is 24.2% and high stress is 9.7%. It may be due to the unfavorable atmosphere at home when online meetings are held from the atmosphere of the work environment and the supporting equipment used during online meetings.

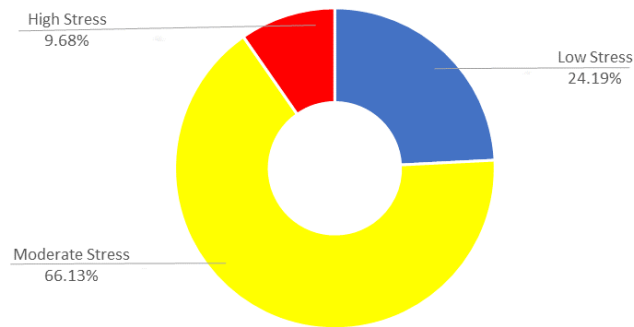


Figure 4. Stress level

## 6. Conclusion

In this study, it was found that the majority of respondents experienced complaints about their body parts, both physically and mentally. It can be concluded that laptops/gadgets in this online meeting have side effects on the participants. It can be seen that 63.2% of respondents experienced visual fatigue, either dry eyes or itchy eyes. Meanwhile, MSD complaints were also felt by respondents who had online meetings, with the majority of complaints occurring in pain/stiff in the upper neck and pain in the waist. It may be because the supporting facilities such as chairs/tables that they use during online meetings are less ergonomic, so respondents feel many complaints.

Furthermore, only 24.2% experienced low stress, the rest of the respondents felt moderate and high stress. It may be because the work atmosphere they usually feel during meetings cannot be ideally felt during these online meetings. Recommendations that can be made in future research are to understand the behavior carried out by workers during online meetings at home. Furthermore, the recommendations that can be given in this study are, online meetings can be an alternative solution in this new normal era, it is just that for the duration, how to sit and the location in conducting these online meetings at home can be conditioned better so that employees do not feel complaints both physically and mentally are expected with the minimum perceived complaints will increase worker productivity even though it is done at home (WFH).

## References

- Analytics, Statqo., *Analisis Digital Terkait Dampak Pandemi COVID19*. Available: <https://id.statqoanalytics.com/post/press-release-per-30-maret-2020-edisi-ke-2-analisis-digital-terkait-dampakpandemi-covid-19>. July 12, 2020.
- Behnoudi Z. *Health and occupational stress*. Tehran, Iran: Boshra-Tohfeh Publications; 2005 [Persian]
- Bodin, T., Berglund, K., & Forsman, M. (2019), Activity in Neck-Shoulder and Lower Arm Muscle During Computer and Smartphone Work, *Journal of Industrial Ergonomics*.
- Chaffin, D. B and Anderson. G. B. J., (1991), *Occupational Biomechanics*, second edition John Wiley and sons.Inc, USA
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983), A global Measure of Perceived Stress, *Journal of Health and Social Behavior*. 386-396.
- Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the United States. In S. Spacapan, & S. Oskamp (Eds.), *The social psychology of health: Claremont symposium on applied social psychology*. Newbury Park, CA: Sage.

- Dickinson C.E, Campion K, Foster A.F. (1992). Questionnaire Development: An Examination of The Nordic Musculoskeletal Questionnaire. *Applied Ergonomics*, Vol.23, pp. 197- 201.
- E.-H. Lee, Review of the psychometric evidence of the perceived stress scale, *Asian Nursing Research* 6 (2012) 121-127
- Fortune Business Insight., *Market Research Report: Video Conferencing Market Size, Share & Industry Analysis, By Type (Telepresence, Integrated, Desktop and Service-based, Middle Rooms, and Large Rooms), By Enterprise Size (Small and Medium Enterprises and Large Enterprises), and Regional Forecast, 2019-2026*. Available: <https://www.fortunebusinessinsights.com/industryreports/video-conferencing-market-100293>. February 15, 2021
- Haug, S., Castro, R.P., Kwon, M., Filler, A., Kowatsch, T., & Schaub, M. (2015), Smartphone Use and Smartphone Addiction Among Young People In Switzerland, *Journal of Behaviour Addiction*, 299-307
- Helander, M. (1995), *A Guide to Human Factors and Ergonomics*. Taylor and Francis. 2ed
- Keputusan Menteri Kesehatan Republik Indonesia Nomor HK.01.07/Menkes/328/2020 Tentang Panduan Pencegahan dan Pengendalian Corona Virus Disease 2019 (Covid-19) Di Tempat Kerja Perkantoran dan Industri Dalam Mendukung Keberlangsungan Usaha Pada Situasi Pandemi. 2020
- Kroemer, K.H.E., & Grandjean, E. (1997), *Fitting The Task to The Human*, Taylor Francis. 5ed
- Kumari M, Badrick E, Chandola T, Adam EK, Stafford M, Marmot, MG, et al. Cortisol secretion and fatigue: associations in a community based cohort. *Psychoneuroendocrinology*. 2009; 34: 1476-85
- Kuorinka, I., Jonsson B., Kilbom A., Vinterberg, H., Sorensen, B.F., Anderson G., dan Jogersen K. 1987. Standardised Nordic Questionnaires for The Analysis of Musculoskeletal Symptoms. *Appl Ergon*, Vol. 18(3):233-237
- Lee, J., Measurement of machine performance degradation using a neural network model, *International Journal of Modelling and Simulation*, vol.16, no. 4, pp. 192-199, 1996.
- Lima, T.M., & Coelho, D. A. (2018), Ergonomic and Psychosocial Factors and Musculoskeletal Complaints in Public Sector Administration - A Joint Monitoring Approach with Analysis of Association. *International Journal of Industrial Ergonomics*. 85-94
- Shalev AY, Yehuda R, McFarlane AC. *International handbook of human response to trauma*. New York, NY, USA: Kluwer Academic/Plenum Press; 2000.
- Shresta, G.S., Mohamed F.N., & Shah, D.N. (2011), Visual Problem among Visual Display Terminal (VDT) Users in Nepal. *Journal of Optometry*. 4 (2) 56-62
- Statista, *Average time spent on online chat or video conference in Indonesia as of August 2020*. Available: <https://www.statista.com/statistics/1189384/indonesia-time-spent-on-video-conference-weekly/> July 30, 2021
- Tarwaka, (2014), *Ergonomi Industri: Dasar-Dasar Ergonomi dan Implementasi di Tempat Kerja*, Harapan Press Surakarta

## Biographies

**Deni Saputra** is an Assistant Professor and Head of the Quality Assurance Unit at the Furniture and Wood Processing Industry Polytechnic, a State Polytechnic under the Ministry of Industry, Kendal, Indonesia. He is a graduate of Industrial Engineering from Adisutjipto Aerospace Technology Institute, Yogyakarta Indonesia, and holds a Master's degree in Industrial Engineering, University of Gadjah Mada. He has experience working as the Head of the Human Capital Business Partner Unit in a Private Company and as the head of the Ergonomics Laboratory and Work System Design Analysis at the University of Muhammadiyah Palembang. His research interests are Human Resources and Human factors.

**Merisha Hastarina** is an Assistant Professor and Head of the Industrial Engineering Department at the Faculty of Engineering, Muhammadiyah University of Palembang. She graduated with a Bachelor of Industrial Engineering from the Islamic University of Bandung and earned a Master's at Gyeongsang National University, South Korea. She has research interests in human factors and manufacturing.