Analysis on The Mental Workload of Female Lecturers During The Covid-19 Pandemic

(Analisis Beban Mental Dosen Wanita Selama Pandemi Covid-19)

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Received 25 August 2021, Revised 22 June 2021, Accepted 23 July 2022, Published 31 August 2022

Abstract. The corona virus (Covid-19) pandemic continues to create significant effect than initially predicted. In addition, the virus spread showed rapid increment, since March 2020, leading to several impacts on human lives, e.g., education. Furthermore, various government policies, including social distance greatly influences teaching and learning activities, both in high schools and universities. As a consequence, conventional face-to-face learning model was temporarily suspended. This implies the need to engage online education. Prior to the outbreak, the mental workload of lecturers was relatively intense, comprising the three basic pillars of higher education (Tridharma), termed education, research and community service, as well as other additional tasks, including final year project supervisions and hold structural position. During the pandemic, mental workload considerably increased considerably as most lecturers, particularly the females also served as home teachers. Therefore the purpose of this research is to analyze the mental workload of female lecturers during the Covid-19 pandemic in Indonesia. Questionaire is used to measure mental workload taken from the National Aeronautics and Space Administration-Task-Load Index (NASA-TLX). Furthermore, the survey is applied to evaluate job demands. The results showed that teaching, research and housewive role influence the mental workload as an aspect with the maximum score. In comparison, a maximum score of 29% on the mental demand aspect generates a physical demand aspect of 27%

Key words: the Covid-19 pandemic, female lecturer, mental workload, NASA-TLX.

Abstract. Pandemi virus corona (Covid-19) terus memberikan dampak signifikan dari yang diperkirakan semula. Selain itu, penyebaran virus menunjukkan peningkatan yang cepat, sejak Maret 2020, yang menyebabkan beberapa dampak pada kehidupan manusia, misalnya pendidikan. Selanjutnya, berbagai kebijakan pemerintah, termasuk jarak sosial sangat mempengaruhi kegiatan belajar mengajar, baik di sekolah menengah maupun universitas. Akibatnya, model pembelajaran tatap muka konvensional dihentikan sementara. Ini menyiratkan kebutuhan untuk terlibat dalam pendidikan online. Sebelum wabah, beban kerja mental dosen relatif berat, terdiri dari tiga pilar dasar pendidikan tinggi (Tridharma), yaitu pendidikan, penelitian dan pengabdian kepada masyarakat, serta tugas tambahan lainnya, termasuk pengawasan proyek akhir tahun dan jabatan struktural. Selama pandemi, beban kerja mental meningkat pesat karena sebagian besar dosen, terutama perempuan, juga menjadi pengajar ke rumah. Oleh karena itu tujuan dari penelitian ini adalah untuk menganalisis beban keria mental dosen wanita selama masa pandemi Covid-19 di Indonesia. Kuesioner digunakan untuk mengukur beban kerja mental yang diambil dari National Aeronautics and Space Administration-Task-Load Index (NASA-TLX). Selanjutnya, survei diterapkan untuk mengevaluasi tuntutan pekerjaan. Hasil penelitian menunjukkan bahwa pengajaran, penelitian dan peran ibu rumah tangga berpengaruh terhadap beban kerja mental sebagai aspek dengan nilai maksimal. Sebagai perbandingan, skor maksimal 29% pada aspek tuntutan mental menghasilkan aspek tuntutan fisik sebesar 27%.

Key words: beban kerja mental, dosen perempuan, NASA-TLX, pandemi Covid-19.

1 Introduction

COVID-19 occurrence in Indonesia was originally announced in early March 2020, and was triggered by a disease known as severe acute respiratory syndrome corona virus 2 (SARS-COV-2).

The term "pandemic" appears frightening, but in reality, refers to the prevalent state, and not the malignancy. Generally, corona virus causes mild or moderate symptoms, e.g fever and cough, although most are resolved within a few weeks. However, for certain people at high risk, including the elderly and people with chronic health problems, including heart disease, high blood pressure or diabetes, critical medical problems become possible (Covid19.go.id).

Therefore, to anticipate the virus spread, government has issued several proactive policies, including social and physical distancing, as well as large-scale public restrictions, known as PSBB. This effort created a significant impact on educational activities, both in high schools and universities. Furthermore, conventional face-to-face learning was temporarily suspended. Therefore, the need to incorporate online learning appears inevitable (Gao et al., 2020).

Prior to the pandemic, mental workload of lecturers was already intense, termed the three pillars (tri dharma), termed teaching, research and community service as well as other additional tasks, including academic (PA), final year project (TA), practical work (KP) and student creativity program (PKM) supervisors, and certain number also hold a position. During the pandemic, the mental workload increased and the lecturers, particularly females, also served as home teachers.

The working load of lecturers to fulfill assigned duties consists of several activities, time and energy, both physically and mentally (Febiyani et al., 2021; Akbar et al., 2021). Therefore, an employee tends become bored with a higher ability beyond job demands, but feels exhausted with lower capacities (Safitri, 2020).

Based on a preliminary study by interviewing 5 female lecturers, comprising 3 from the Industrial Engineering study program at Mercu Buana University (UMB) and 2 from the Wastukancana College of Technology, excessive physical and mental fatigue tend to decline performance (Akbar et al., 2021). During the pandemic, lecturers are expected to teach online, with the provisions of laptops, internet connection and learning platform e.g POST and Simak Wastu Digital online media for UMB and Wastukancana College of Technology, respectively. Furthermore, poor laptop conditions and network access create unnecessary stress, resulting to mental and physical fatigue (Dewi et al., 2019).

Also, children are expected to study online, with parents having to provide more devices, including laptops, cellphones and internet subscription (Setianingrum et al., 2018). There is also a need to provide guidance in terms of study, helping with assignments, and discipline, as primary school students require sufficient attention (Setianingrum et al., 2018). The continous stay of children at home also add to the domestic burden, especially in families without an assistance. In the situation, the parents have to prepare food more often, compared to when school was in session (Bhandary et al., 2016). The mental and physical burden experienced by these parents' decreases productivity, including delay in work completion and reduced quality, as well as postponing journal publications or research activity (Restuputri et al., 2021). Furthermore, 5 lecturers complained about inadequate rest or sleep, due to the large mental workload and also missed certain amount of the children's work schedules or assignments. This circumstance poses as a concern to workplace organizations, schools and government (Junaedi et al., 2020).

Previous research related to the mental workload of nurses at Dr. Salamun Hospital, Bandung, showed a higher category of overall average mental workload (Iridiastadi & Yassierli, 2014). Therefore, the hospital management is expected to periodically conduct mental workload assessments to ascertain a conducive work environment. Another similar study on State Islamic Institute Palangkaraya lecturers, obtained an average mental workload score of 82 in the severe category (Safitri, 2020; Widana et al., 2018).

Mental workload measurement can be conducted using the National Aeronautics and Space Administration - Task-Load Index (NASA – TLX) questionnaire (Ferianto et al., 2018; Alaimo et al., 2020). Also, the form is widely used to evaluate job demands. There are 6 aspects, including mental demand (MD), physical demand (PD), temporal demand (TD), performance (P), effort (E) and frustration (F) (Adiatmika et al., 2007).

The purpose of this research is to analyze the mental workload of female lecturers during the Covid-19 pandemic. Possible solution is designed, where the subjects are able to effectively balance the dual roles at work and home, stay physically and mentally healthy, feel safe and comfortable in performing each role, resulting to optimal performance.

2 Method

The samples were comprised of permanent female lecturers at the Industrial Engineering Study Program at Mercu Buana University (UMB) and the Industrial Management Study Program at the College of Technology Wastukancana, having fulfilled the inclusion criteria, each with a total of 10 female participants. NASA TLX questionnaire was distributed online during the COVID-19 pandemic, using Google Form (Asih et al., 2022; Said et al., 2020; Yuliani & Tambunan, 2018). Measurement steps using NASA TLX are as follows can be seen Table 1.

Table 1 Measurement steps using NASA TLX

Scale
Low-High
Low-High
Low-High
Good-Bad
Low-High
Low-High

Source: (Adiatmika et al., 2007).

b. Weighting

The respondents were asked to select 1 of the 2 indicators assumed to be more dominant in instigating mental workload. The NASA-TLX questionnaire was distributed in the form of 15 pairwise comparisons. Subsequently, the weighting stage was followed by calculations to obtain the workload (*Mean Weighted Workload*).

c. Rating

The respondents were requested to rate the 6 indicators of mental load. The rating is subjective depending on the mental load felt by the participant. However, to achieve the NASA-TLX mental load score, the weighting and rating for each indicator are multiplied, added and then divided by 15 (number of paired comparisons).

d. Interpretation of score results

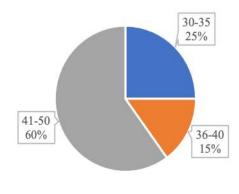
In the NASA-TLX theory, the resulting workload scores are interpreted as follows:

- A score of > 80 or an average value of > 11.6 indicates a heavy workload
- A score of 50 70 or an average value of 8.3 11.6 indicates a moderate workload
- A score of < 50 or an average value of < 8.3 indicates a light workload.

3 Results and Discussion

3.1. Data Collection

The respondents of this research comprise permanent female lecturers of the Industrial Engineering study program at Mercu Buana University and the Industrial Management study program at the College of Technology Wastukancana, totaling 20 lecturers. Figure 1 shows the age data of the participants.



30-35 36-40 41-50

Figure 1 Respondents' age distribution.

Based on Figure 1, the age of the respondents estimates approximately 25%, 15% and 60%, ranging from 30-35, 36-40 and 41-50 years old, respectively.

The data processing for the initial stage was to determine the weighting (paired comparison) in Table 2, followed by calculations to obtain the workload (mean weighted workload). Table 3 provides an example of evaluating the WWL scores.

Number	Indicator	Tally	Score
1	Mental Demand (MD	1111	4
2	Physical Demand (PD)	Ш	3
3	Temporal Demand (TD)	Ш	3
4	Performance (OP)	I	1
5	Effort (EF)	1111	4
6	Frustation (FR)	-	-
	Total		15

Table 2 The calculation example of paired weighting (paired comparison) for respondent A

No	Respondent	Indicator	Rating	Weight	WWL
1	А	Mental Demand (MD	80	4	320
		Physical Demand (PD)	80	3	240
		Temporal Demand (TD)	80	3	240
		Performance (OP)	80	1	80
		Effort (EF)	80	4	320
		Frustation (FR)	50	0	0
		Amount		15	1200
	WI	VL AVERAGE (Weighted Wo	orkload)		80

Based on the above calculations, lecturer A's mental workload was classified as heavy/high.

3.2. Analysis on each NASA – TLX indicator

This research provides an input to academics on the aspects of mental workload in fulfilling certain obligations in lecturing, research, community service, and as housewives in guiding the children and performing domestic chores.

1. Education/Teaching

As seen as in Figure 2, the classification of heavy mental workloads showed the highest score of 10 persons, moderate mental workloads of 9 respondents and low mental workloads of only 1 person. These results showed most of the lecturers with a heavy and moderate mental workload, due to online mechanisms capable of consuming sufficient time and energy, particularly setting up devices, internet, and other necessities.

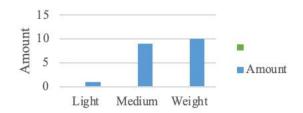


Figure 2 Classification of educational/teaching activity workloads.

2. Research

As seen as on Figure 3, the classification of heavy mental workloads showed the highest value of 11 persons, moderate mental workloads of 8 people and low mental workloads of only 1 individual. These results indicated most of the lecturers with a heavy and moderate mental workload. Moreover, the research conducted during the pandemic was very intense, due to government policies, including social and physical distancing, as well as large-scale social restrictions (PSBB). Therefore, various alternative methods were adopted in obtaining the research data e.g Google Forms, Google Meet, Zoom and so on, although the efforts created additional mental burden.

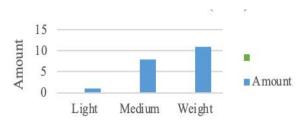


Figure 3 Classification of the research activity workload.

3. Community Service

As seen as in Figure 4, the classification of moderate mental workloads showed the highest score of 7 persons, heavy mental workloads of 8 people and low mental workloads of barely 5 individuals. These results revealed most of the lecturers with a high and moderate mental workload. In the light workload score, 3 respondents did not partake in community services. During a pandemic, participating in these activities is similar to conducting research, as several obstacles were reported, and therefore, the mental burden tends to be extensive.

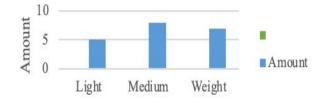


Figure 4 Classification of the community service activity workloads.

4. Hold a Structural Position

As seen as in Figure 5, the classification of heavy mental workloads showed the highest score of 8 persons, moderate workloads of 5 individuals and low mental workloads of only 7 participants. These outcomes showed most of the lecturers with a high and light mental workload. In the light workload score, 3 respondents did not hold structural positions, and therefore, no scores were generated. Furthermore, holding a structural position during the pandemic appeared very complex, with increasing responsibilities. For instance, the Head and Secretary of the Study Program are expected to effectively organize lectures, workshops, final assignment sessions and others activities online. As a result, the mental workload becomes more intense.

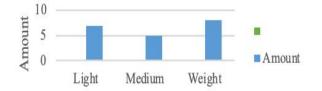


Figure 5 Classification of the structural position activity workloads.

5. Become a Housewife

As seen as in Figure 6, the classification of heavy mental workloads obtained the highest workload score of 12 people, the moderate mental workload of 5 participants and the low mental workload of only 3 persons. These results showed most of the lecturers with a high and moderate mental workload. In the light workload score, 2 respondents did not serve as housewives, and therefore, no scores were generated. During the pandemic, children were engaged in online learning, with adequate parental guidance, especially with the mother. This learning condition was not stress-free, as the parents had to initially comprehend the topics and assignments. Furthermore, working with children appears very demanding, particularly as boredom gradually intrudes. Parents tend to become impatient and easily annoyed, resulting to arguments and additional mental burden. In the case of 2 respondents with no scores, the first respondent's child did not input school age and had no need for parental guidance, while the second was at high school level, also with no need for supervision.

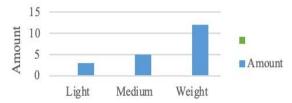


Figure 6 Classification on the activity workload of being a housewife.

6. Performing Domestic Work

As seen as in Figure 7, the classification of heavy mental workloads showed the highest workload score of 11 people, the moderate mental workload of 3 respondents, and low mental workload known to only 5 persons. This outcome showed most of the lecturers with a high and light mental workload. In the light workload score, 2 respondents did not partake in domestic activities, and therefore, no score was available. During the COVID-19 pandemic, government policies, including social and physical distancing, as well as large-scale public restrictions (PSBB), also contributed to the absence of domestic workers.

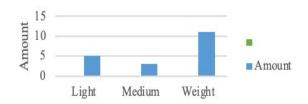


Figure 7 Classification of workloads for domestic work activities.

3.3. NASA-TLX Elements Comparison

The data processing showed the most dominant aspect, where the sum and percentage of each aspect showed the most influence mental workload in separate field.

1. Education/Teaching

Figure 8 indicated the maximum mental workload indicator as MD (Mental Demand) with 30%, followed by PD (Physical Demand) at 21%.

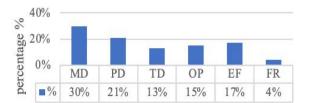


Figure 8 Comparison of NASA-TLX aspects on educational/teaching activities.

2. Research

Figure 9 showed the optimal mental workload indicator as MD (Mental Demand) with 25%, followed by PD (Physical Demand) at 22%.

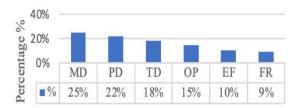


Figure 9 Comparison of NASA-TLX aspects on research activity.

3. Community Service

Figure 10 displayed the maximum mental workload indicator as MD (Mental Demand) with 28%, followed by PD (Physical Demand) at 20%.

20%						
0%	MD	PD	TD	OP	EF	FR

Figure 10 Comparison of NASA-TLX aspects on Community Service activities.

4. Structural Position

Figure 11 showed the greatest mental workload indicator as MD (Mental Demand) with 29%, followed by PD (Physical Demand) at 22%.

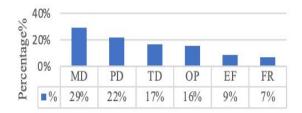


Figure 11 Comparison of NASA-TLX aspects on structural position activity.

5. Becoming a Housewife

Figure 12 showed the optimal mental workload indicator as PD (Physical Demand) with 27%, followed by MD (Mental Demand) at 25%.

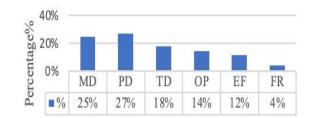


Figure 12 Comparison of NASA-TLX aspects on housewife activity.

6. Conducting Domestic Work

Figure 13 showed the maximum mental workload indicator as PD (Physical Demand) with 26%, followed by MD (Mental Demand) at 25%.

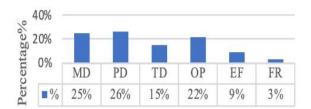


Figure 13 Comparison of NASA-TLX aspects on domestic work activities.

4 Conclusion

Based on the final NASA-TLX score for female lecturers during the Covid-19 pandemic, mental workload appeared as the maximum aspect. This outcome was due to the increase in the workload, with the additional role as home teachers, particularly the female lecturers. The final NASA-TLX score with the most influence on mental workload occurred in teaching, research activities, and housewives. Also, the optimum comparison of NASA-TLX aspects obtained the mental demand aspect at 29%, while the physical was 27%.

The following suggestions were offered to reduce mental workload on female lecturers, including:

a) Education:

The need for adequate preparation prior to an online session, using a suitable internet provider, checking necesary devices, e.g laptops and cellphones as well as backups, ensuring detailed and complete materials, and creating class groups for effective communication.

- Research and Community Service: Collaborating with other industries or institutions, to lessen obstacles in data collection.
- c) Activities as a housewife to guide the children The lecturers with children are advised to develop a functional strategy towards an effective online learning. This arrangement ensures a tutor or sibling is engaged at home in the case of excess work, or the tasks are shared among the elder brother or sister to offer necessary support. There is a need to schedule activities for children and parents, to guarantee timely performance. Furthermore, sharing sessions on the obligations and rules necessary for effective home study are encouraged. This opportunity fosters discipline and proper planning.
- Activities in performing domestic chores. The lecturers with large workload are advised to employ domestic staff to reduce physical fatigue, and ensure other activities run efficiently. Employing assistants on a stay-at-home basis, help to minimize the virus spread.

The parents, particularly the female lecturers, known to consistently forget activities, due to intense mental burden, are advised to daily schedule engagements with a reminder system, using a scheduling program, including MS Outlook.

Acknowledgement

The authors are grateful to Rector of Mercu Buana University, Chairman of Wastukancana Technical College, Director of Research and Technology, Publications and Domestic Cooperation, Head of Research Center, Female Lecturers of the Industrial Engineering Study Program, Mercu Buana University, Female Lecturers of the Industrial Management, Wastukancana Technical College, and all those that helped in this research. This research was funded by the KDN Mercu Buana University-Wastukancana Technical College, with contract number 02-5/908/B-SPK/III/2021.

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