WORKERS' MENTAL WORKLOAD IN INDONESIAN SMALL FOOD-PRODUCING BUSINESS: PRELIMINARY FINDINGS AT A CORN CHIPS BUSINESS

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Abstract

This research investigated conditions of mental workload among workers in Indonesian small food-producing business, and how work and workers characteristics might influence the workers' mental workload. A corn chips business located in an industrial central of corn chips in Malang municipality, Indonesia was the research object, in which its seven workers were involved as participants. NASA-TLX measurement involving six mental workload subscales was deployed to observe the current state of workers mental workload, along with determination of mean WWL value as representation of mental workload level. Measured NASA-TLX subscales varied among tasks and subscales, with indications of exposures of mental workload to the workers. This was indicated by high ratings of Mental Demand, Temporal Demand, Effort, and Frustration subscales which reached 70, 80, 90, and 70, respectively. Mean WWL values were in the range of 46.00 to 70.67, with the highest value observed was on Task 2 with 70.67 and Task 5 has the lowest value of 46.00. It is suggested that tasks and workers characteristics could have different influence on the observed mental workload subscales ratings and WWL. This research provides base of understanding and findings on states of workers' mental workload in Indonesian small food-producing business.

Keywords: *food business; mental workload; NASA-TLX; small business*

1. Introduction

Indonesia is one developing country where existence of small businesses is abundant. In 2018, the Indonesian Central Bureau of Statistics recorded that 4,264,047 (99.31%) businesses were operating in small and micro scale from total 4,293,601 units of businesses (Badan Pusat Statistik, 2020). One kind of product which often produce by small businesses is food products, which almost certainly can be found on all regions in a country, including in Indonesia. In 2019, 1,587,019 (36.23%) units from the total 4,380,176 units of micro and small businesses were food businesses, in which they employed 3,257,963 (34.02%) workers from the total 9,575,446 workers (Kamil et al., 2020). These numbers of statistics highlight the majority and vital role of micro and small businesses, particularly in the food sector, for Indonesia's economic and employment.

Small businesses in developing countries often associated with poor working conditions, potentially expose the workers to health and safety risks (Hermawati et al., 2014). Isahak et al. (2017) emphasized that in Small and Medium Enterprises (SMEs), both physical environment and work method affect workers' well-being. Silalahi et al. (2021) highlighted that indication in Indonesian small food businesses, by explaining issues related to safety and ergonomics, such as their unsuitability of work design, unsafe acts and environment, and ignorance. Moreover, negligence or ignorance to problems related to ergonomics are commonly found in industries of SMEs (Siong et al., 2018). Siong et al. (2018) further suggested that ergonomics issues in SMEs mostly addressed through analysis of design of tools or workstations and work posture. In the domain of Indonesian SMEs, that suggestion was echoed in a critical review paper by Hermawati et al. (2014) who found that 66% of the 144 papers reviewed were in the topic of work posture and design of tool or station. In more specific object of Indonesian small food-producing businesses, we also recognized the trend, in which topics of work posture and work design are popular, as shown by studies by Wulandari & Umam (2020), Hardima et al. (2018), Sokhibi et al. (2020), Soenandi et al. (2020), and Setyowati et al. (2017). While this popular research topic research topics on work posture or work design certainly provide knowledge in works at Indonesian small food

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businesses or other similar work settings, it can also indicates overlooking of another important topic such as mental workload.

Regarding workers' workload, some studies such as Kusgiyanto et al. (2017), Silalahi et al. (2011), and Silalahi et al. (2018) were carried out at various small food businesses, on which these studies were exploring physical workload. However, studies that looked into mental workload of the workers at Indonesian small food-producing businesses are still limited. Furthermore, mental workload studies in objects located in Indonesia were mostly carried out in non-food business, such as in office or administration workers (Nataria et al., 2019; Talumantak et al., 2016), fashion businesses (Suryoputro et al., 2016), and assembly lines of non-food equipment (Purbasari & Purnomo, 2019; Setiawan & Kusmindari, 2020). Our allegation is that it is commonly understood that activities in Indonesian small food-producing businesses are more to physically rather than mentally demanding tasks. This could be due to their characteristics of manual work of tasks, with predicted possible exposure to the workers are more to physical constraints, e.g. work posture and physical workload. This was highlighted by Silalahi et al. (2018), on which the study was carried out at the same object of this current research, who found that the workers are having moderate to high level of physical workload, based on the measured heart rate and oxygen consumption. This could contribute to overlooking of workers' mental workload in the Indonesian small food-producing businesses, which indicated by the limited numbers of related studies.

With the above allegation in mind, it is worth noting that either low or high mental workload could have negative influences. Longo (2018) pointed out that even low mental workload could give frustration or annoyance, while high mental workload could cause confusion. Additionally, physical workload can contribute to mental workload, in which how physical demands contribute to mental workload is often neglected (Young et al., 2015). Mulder (1992) also pointed out that physiological indicators, e.g. heart rate and respiration, could be impacted by not only physical workload but also mental workload. Furthermore, physical states and processes of human body relates to mental workload (Galy et al., 2012) and physical issue such as Work-related Musculoskeletal Disorders (WMSDs) can be a result of interactions between physical, psychological, and psychosocial aspects (Nino et al., 2020). This further imply that examination of mental workload is not less important for the seemingly more physical activities of Indonesian small food-producing businesses.

The objective of this research was to investigate conditions of mental workload among workers in Indonesian small food-producing business, and how work and workers characteristics might have influence towards the mental workload. As explained previously in this background section with existing related literatures, there is a gap of knowledge and research in investigation of mental workload among workers of Indonesian small food-producing businesses, with limited studies on an important aspect of mental workload of workers well-being in the studied work setting. It is expected that results of this research would contribute to filling that gap by providing preliminary findings from case study of workers' mental workload at a small-sized Indonesian food-producing business, as insightful base of considerations for future related studies.

2. Method

2.1. Design

2.1.1. Research object

This research was conducted at a small-sized corn chips business, located in Malang municipality, East Java province, Indonesia. The business was selected for this research object based on previous findings of their relatively high physical workload (Silalahi et al., 2018), which could influence the workers' mental workload (Colle & Reid, 1998; DiDomenico & Nussbaum, 2008). This would contribute to propose future studies to investigate various influences towards workload in similar object. Moreover, the small size of the business and small number of workers are considered to be an appropriate steppingstone of preliminary findings for future related studies. The observed corn-chips business is operating in small size, indicated by its number of workers of seven, marketing and distribution are of mainly local, and amount of income. The business located in an industrial central of corn chips SMEs, with the business is one of the experienced and longest-operating ones, as well as the leading ones based on its production capacity and amount of sales.

2.1.2. Mental workload measurement

Quantitative study and analysis based on results of NASA-TLX criteria questionnaire was carried out in this research. NASA-TLX was used as it can obtain a subjective mental workload score based on weighted rating (DiDomenico et al., 2008), involving combination of six workload subscales representing

Table 1. Scale of Mental Workload Measurement

Scale	Endpoints	Description
Mental demand (MD)	Low (0) – High (100)	Demand or required mental and perceptual activity of the task.
Physical demand (PD)	Low (0) – High (100)	Demand or required physical activity of the task.
Temporal demand (TD)	Low (0) – High (100)	Pressure and pace felt during the task.
Performance (P)	Good (0) – Poor (100)	Level of satisfaction and success in accomplishing the task.
Effort (E)	Low (0) – High (100)	Effort (mentally and physically) made for task and performance accomplishment.
Frustration level (FL)	Low (0) – High (100)	Insecurity, discouragement, irritation, stress, and annoyance of the task.

estimation of experienced workload by people, while or immediately after doing a task (Hart, 2006). The subscales are presented in **Table 1**, as adapted from Hart & Staveland (1988). Hart & Staveland (1988) validated this instrument to give meaningful subjective workload assessment. The workers were asked to rate their assessment on each scale based on their experience on performing each task with rating range of 0 to 100, respective to each endpoint.

2.2. Participants

Seven workers in production process of a corn chips SME in Malang municipality, East Java province, Indonesia were involved as participants of this study. These were all seven workers who were working at the business, at the time of this research was conducted. All workers were chosen as participants of this research as the number was relatively small and attainable to investigate mental workload on all workers and activities. The production process consists of eight tasks, where each worker was assigned to one or more specific task. Profile of participants presented in **Table 2.**

2.3. Procedures

Before the research began, the researchers of this research had discussion with the owner of the business to inform the purpose and procedures of this research. After the owner agreed for this research to be conducted in the business, another discussion was held with the workers as prospective participants. Purpose and procedures of this research were explained to them, as well as more detailed steps of the research, e.g. format and wording of the questionnaire and meaning of the rating scales. All seven workers were agreed to participate. The workers gave their responses of rating of the mental workload subscales right after each worker finished the respective task. This was to ensure that the workers' responses to the questionnaire accurately reflect their perceptive mental workload, and to ensure that their tasks were not obstructed. After each worker gave response and rated the subscales, they were asked to review their answers and asked clarifying prompt questions of "Are you confident of your answers and they reflect your actual feeling? Are there any rating that you would like to change?". These were to ensure accurate responses and reflection of experience mental workload, and to give opportunity for correction.

2.4. Analysis

2.4.1. Criteria weighing

In addition to determining the rating of the mental workload scales, the participants were also asked to provide weigh between subscales. Prior to determining the mental workload criteria scores, criteria weighing was carried out. Although some previous studies (Moroney et al., 1995, 1992; Nygren, 1991) highlighted that weighted ratings would result in not significantly difference to unweighted ratings, Hart & Staveland (1988) pointed out that each individual's knowledge is unique, which might influence the ratings.

Pair-wise comparison technique was deployed to determine weight among the subscales, with the pair-wise comparison score presented on **Table 3**. Pairwise comparison used as it is able to derive preference, weight, and scale of alternatives with given criteria (Choo & Wedley, 2004; Saaty, 2008), which needed to determine the final score of mental workload in this study.

2.4.2. Weighted Workload Level (WWL)

To calculate WWL for each task, firstly product value for each subscale on each task was calculated using equation (1).

$$product\ value_{xn} = subscale\ rating_{xn} \times weight_{xn} \quad (1)$$

Table 2. Profile of Research Participants

Participant	Gender	Weight (kg)	Height (cm)	Age (years)	Work length (years)	Task
Worker 1	Male	65	164	36	4	Task 1: steaming
Worker 2	Male	68	160	21	3	Task 2: washing 1 and soaking
						Task 3: washing 2
Worker 3	Male	70	175	35	11	Task 4: steaming 2
Worker 4	Male	80	170	31	1	Task 5: cooling
Worker 5	Male	86	167	36	7	Task 6: flattening and drying
Worker 6	Male	71	175	34	11	Task 7: sieving
Worker 7	Male	71	170	30	8	Task 8: frying

Table 3. Pair-wise Comparison Scores of Subscales Weighing

Weight score		Description
1	:	Same amount of having both mental workload criteria
3	:	This task might have higher mental workload of criteria x than y
5	:	This task should have higher mental workload of criteria x than y
7	:	This task would have higher mental workload of criteria x than y
9	:	This task definitely has higher mental workload of criteria x than y
2, 4, 6, 8	:	Weight score between the described scores
1/x; x=1-9	:	Reverse weight between x and y

Table 4. NASA-TLX Subscales Ratings as Scored by The Workers

Task	MD	PD	TD	P	E	FL
1	40	70	80	30	60	50
2	70	90	60	20	70	70
3	60	80	80	20	80	70
4	60	80	60	30	90	70
5	40	50	50	30	70	50
6	20	70	80	30	90	50
7	30	60	70	20	70	50
8	50	70	80	20	70	60

Sum of product values of six subscales for each task were then calculated to obtain WWL value for each task, using equation (2).

$$WWL_n = \sum product\ value_{xn} (2)$$

Finally, mean WWL value on each task was divided by 15, which was the number of pair-wise comparison, to obtain the average WWL value to determine the final mental workload level using equation (3).

$$mean\ WWL_n = \frac{WWL_n}{15}$$

3. Results and Discussion

3.1. NASA-TLX Subscales Ratings

Ratings given by the workers on the six subscales of mental workload based on NASA-TLX are presented in **Table 4**. In general, ratings vary among tasks and subscales, with the widest range between 50 to 90 on PD, while P has the shortest range between 20 to 30. The results indicated high ratings on PD and E on tasks, as they reached rating of 90 on some tasks. High ratings on TD were also explored, as some of the tasks reached TD rating of 80. Although P subscale has a relatively lower ratings of 20s and 30s, it is needed to keep in mind that lower ratings on P indicate better performance. MD and FL both reached rating of 70 on some tasks, with MD has wider range from 20 to 70 and shorter range on FL of 50 to 60.

In general, regarding mental workload as the focus of this study, the NASA-TLX subscales results showed that workers were potentially exposed to mental workload from various sources. Subscale MD clearly indicated exposure of mental demand on some tasks with high rating of 60 and 70. The workers also felt pressure and pace as TD subscale reached rating as high as 80, which could contribute to their mental workload. Fairly high ratings of 60 and 70 were also observed on FL subscale, which further indicated mental exposure of frustration such as stress and annoyance.

The variance and ranging ratings given by the workers to the NASA-TLX subscales could contributed by some factors. In this research, we tried to observe the difference of subscales through the work characteristics of tasks and workers profile.

3.1.1. Influences of work characteristics on the subscales

Results of the MD subscale, which defined by Hart & Staveland (1988) as demand or required mental and perceptual activity of the task, showed that each task gave different MD to the workers. Highest MD is on Task 2, while the lowest is on Task 6. Task 2 included washing and soaking which, at first impression, looked relatively physical as the worker working with relatively heavy materials, as well as relatively long period of task. Therefore, it is rather surprising that Task 2 obtained the highest MD rating of 70. Further observation resulted that those tasks in Task 2 are very important tasks which affecting quality of final product of corn chips. Moreover, Task 2 is vital as it involves certain standards for the output, and any mistakes would obstruct the overall production process. Delti et al. (2018) explained that production of corn chips involves washing and soaking which are important for the next steps. Other interesting results is the lowest MD rating of 20 on Task 6. Certain important standards are to be achieved in Task 6, which is flattening and drying, so it is rather surprising that the Task 6 worker gave low rating on MD. He stated that the standards of outputs for Task 6 is easier to achieve than other standards on other tasks. These differences on task characteristics indicates that characteristics of tasks might differently affect the workers' mental workload, as pointed out by Hancock et al. (1995).

Initial impressions from the ratings given by the workers on the subscales indicate that works in Indonesian small food-producing businesses, particularly the observed corn chips business, were rather physically demanded than mentally. This mainly indicates by the higher ratings of physical demand than mental demand on all tasks. PD on NASA-TLX subscales defined as demand or required physical activity of the task (Hart et al., 1988). Worker in Task 2 practically did two tasks of washing and soaking, which involved relatively heavy materials of corn kernels and large amount of water, which could contribute to the high rating PD of 90. Relatively heavy tool used (thick wooden stirrer) and the tasks' movements could also add to this high rating. This is in conjunction with findings of Qiu & Helbig (2012) who found differences of workload on various tasks with different posture, and they emphasized that workload can be indicative of the body posture. Imbalance of workload may also be affected by factors that are not considered, such as equipment (Inegbedion et al., 2020). Task 3 and Task 4 were other similar tasks of further washing and steaming, respectively, but each were performed by different worker. This resulted in slightly lower PD of 80 compared to Task 2, in which the worker did both washing and steaming. Task 5 had the lowest rating of PD, as it was a cooling task which relatively less physically demanded that other tasks. Worker on Task 5 mainly waiting for the steamed corn kernels to cool down, with only physical task was only putting and arranging the corn kernels on cooling racks. As discussed earlier, that tasks differences may affect mental workload differently (Hancock et al., 1995)

Hart & Staveland (1988) defined TD as pressure and pace felt during the task, in which work pace might affect production quality, which increase possibility of errors (Bosch et al., 2011). Task 1, Task 3, Task 6, and Task 8 have the highest ratings of 80 on TD subscale. Although Task 1 and Task 3 were not fast-paced tasks, their importance in affecting the overall production at the start of the process could rise pressure to the workers. Task 1 and Task 3 are washing tasks which are very important in determining the quality of final products, and important in ensuring smoothness of the next steps of tasks (Delti et al., 2018). Moreover, as they are two tasks at the start of the overall production process, they could obstruct the production process if something is not done appropriately. Similarly, Task 6 and Task 8 also have very important role in determining the quality of final products of corn chips. Task 6 is flattening and drying tasks in which both have certain standards to be fulfilled for desired quality of final produce of corn chips. Task 8 is frying task which is the final task that have to be done in certain period of seconds, so that the corn chips will not be overcooked. Moreover, worker on Task 8 has to conduct frying in some required pace to do it appropriately. As explained by Silalahi et al. (2018) that frying task in corn chips production requires precise timing to ensure the desired quality. These work characteristics and standards required on Task 1, Task 3, Task 6, and Task 8 could contribute to the relatively high temporal demand ratings. It is worth noting that for the other tasks, i.e. Task 2, Task 4, Task 5, and Task 7, although their temporal demand ratings are lower, the ratings are still considerably high as they are all have ratings of above 50. This further indicates that tasks in the observed corn chips business have to be performed in certain pace and gave certain pressure to the workers and contributed to the workers' mental workload.

It is worth reminding that the ratings on subscale P were inverted, where lower rating indicates good performance and poor performance on higher rating. As defined by Hart & Staveland (1988), subscale P is level of satisfaction and success in accomplishing the task. The left end of the P scale is "good" performance rating, while the right end reflects "poor" performance (Laurie-Rose et al., 2014). All tasks were given rating of 20 or 30 by the workers on P subscales, indicating good level of success and satisfaction of the workers in accomplishing the tasks. Or, in other words, the workers felt that they performed well in doing their respective tasks. Ratings of 20 on P subscales were observed on four tasks of Task 2, Task 3, Task 7, and Task 8, while the other tasks have P subscales rating of 30. These indicate that all workers on all tasks felt that they achieved what they were tasked to. However, it is worth noting that no worker on any task gave rating of 10, which is the best rating for P subscale, which would indicate the best performance. This could indicate that the workers might feel they could have done something better, or something was performed below their expectations or required standards.

Subscale E, which can be referred as combination of both mental and physical effort to accomplish the task (Hart et al., 1988), shows variation of ratings among tasks between 60 to 90. Task 4 and Task 6 have the highest E ratings of 90, while the lowest rating on E is on Task 1 with 60. The physical demand of Task 4 could contribute to it became the highest rating on E, as showed by PD rating of 80. Task 4 involves lifting of stirring relatively heavy amount of materials and lifting of buckets of corn kernels weighed about 30 kilograms several times. Although Task 6 indicatively has the lowest mental demand as indicated by the lowest MD rating, Task 6 involved lifting of relatively heavy buckets and drying racks which could demand high effort by the worker. Moreover, Task 6 often performed under hot exposure of sunlight, especially on clear sunny day. Task 1 is the first task of the production process performed at early mornings of workdays, which could enable Task 1 worker to work in optimal conditions, as stated by Vallo & Mashau (2020) that working hours could affect productivity. Task 2, Task 3, and Task 4 share the same ratings of 70 on subscale FL, which defined as insecurity, discouragement, irritation, stress, and annoyance of the task (Hart et al., 1988). As discussed previously, these three tasks also indicate relatively higher ratings of mental workload on all subscales, compared to the other tasks. These three tasks are arguably among the most important tasks in the production process, which greatly influence both final product quality and the overall flow of production process. Van Hooft & van Hooff (2018) pointed out that task characteristics, including time pressure may impact certain affective or cognitive aspects of an individual. Consequently, these tasks resulted in higher frustration levels to the workers.

3.1.2. Influences of workers profile on the subscales

While characteristics of tasks performed by the worker could contribute to differences on the observed NASA-TLX subscales ratings as discussed in previous section, profile of the workers could also differently affect the mental workload. It has been understood that individual characteristics is one key variable that influences workload modification and psycho-physiological response (Jafari et al., 2019). Meshkati & Loewenthal (1988) also emphasized that one of the most influential factors affecting subjective ratings is individual differences. As presented on **Table 2** on previous sub-section of "Participants", workers involved in this research has several differences on their profile. Although they were all males, their physical attributes of height and weight were all different too. All seven involved workers were also on different ages, with different experiences in terms of length working in the business.

Task 2, Task 3, and Task 4, in which highest ratings of MD and PD were observed, were performed by Worker 2 (Task 2 and Task 3) and Worker 3 (Task 4). These three tasks performed by the respective two

Table 5. WWL Values of NASA-TLX Subscales on Each Task

Task	Product Value						WWL	Mean WWL
	MD	PD	TD	P	E	FL		
1	240.00	210.00	240.00	30.00	60.00	50.00	830.00	55.33
2	420.00	360.00	120.00	20.00	70.00	70.00	1060.00	70.67
3	360.00	320.00	160.00	20.00	80.00	70.00	1010.00	67.33
4	300.00	240.00	180.00	30.00	90.00	140.00	980.00	65.33
5	160.00	150.00	150.00	60.00	70.00	100.00	690.00	46.00
6	100.00	210.00	160.00	90.00	90.00	50.00	700.00	46.67
7	150.00	180.00	210.00	40.00	70.00	50.00	700.00	46.67
8	300.00	280.00	160.00	20.00	70.00	60.00	890.00	59.33

workers who also observed the highest FL, and among the highest ratings on E. Worker 2 is the youngest among all workers with 21 years of age, and the tasks he performed at the business was his first job. Although worker 2 has been doing the task at the business for three years, it was among the shortest working length compared to the other workers. His relatively young age and few working experiences could contribute to the high ratings of mental workload subscales that he gave. Individual characteristics, e.g. experience and age, and capabilities influence individual mental workload (Brazales et al., 2018). Lopez-Lopez et al. (2018) further pointed out that age can be a factor for the development of mental workload. This possible factors of age and experience, added with the demanding work characteristics of Task 2 and Task 3 as discussed previously, could strongly contribute to the high ratings of mental workload subscales on Task 2 and Task 3. However, contrasting worker profile found in Worker 3 who was relatively much older than Worker 2 and have relatively much more experience, but also observed high mental workload subscales ratings as Worker 2. This rather conflicting but interesting finding could be influenced more by Task 4 characteristics which was physically demanding and required certain effort. While mental workload is related to the task and individual capacity, it could also be affected by work requirement (Galy et al., 2012). The fact that Task 4 was one of the most important tasks could also make the workers felt more pressure and workload, both physical and mental.

Task 6 and Task 7, which respectively performed by Worker 5 and Worker 6, have lower MD than the other tasks. These tasks have PD ratings of 70 and 60, respectively, which are also lower compared to the other tasks. Worker 5 Worker 6 are among the most experienced workers in the business, with work length in the business of seven years and eleven years. These work experiences could make the two workers get used to the tasks which results in the relatively low MD, as emphasized by Grier (2015) and Young et al. (2015) that individual experiences might affect mental workload. Similarly on the FL subscale, Worker 5 and Worker 6 also have lower ratings, which could also be affected by the experience and habitual routine work. Worker 1 and Worker 4, who respectively performed Task 1 and Task 5, were among the two least experienced workers in the business. Worker 1 has been working on the task for four years, while Worker 4 has been performing the tasks for only one year. Despite their shorter length of work in the business compared to the other workers, Worker 1 and Worker 4 observed lower ratings on the NASA-TLX subscales almost on all subscales, particularly on MD, E, and FL. It was revealed that these two workers have experiences of working in other businesses before started at this observed business, performed the same or other similar tasks. The businesses that they worked in the past were also located in the same area of industrial central with similar work environment. These similarities of work environment could make the workers already familiar with the tasks, which consequently leads to lower ratings of mental workload subscales. Chen et al. (2019) stated that when an individual is familiar enough with certain task, it is possible that the mental workload is lower.

3.2. Observed Mental Workload

Mean WWL (Weighted Workload Value) as representation of the final mental workload measured by the NASA-TLX subscales are presented in **Table 5**. In overview, the obtained mental workload values range from 46.00 to 70.67, in which the lowest and highest are Task 5 and Task 2, respectively. There has been no exact categorization of the level of mental workload based on the mean WWL values. Hart (2006) and Grier (2015) pointed out that interpretation of scores is one limitation of NASA-TLX, where a reference to state the level of an observed workload (e.g. low, medium, high) is not yet available. However, the measured workload on this research could be an important valuable finding for further related studies.

As discussed on the previous subsection, Task 2 involved tasks of washing 1 and soaking, which arguably one most important task of the overall production process. Furthermore, tasks in Task 2 involved relatively heavy materials and tools, as well as unfavorable working movement or postures. In addition to that, Task 2 worker has the smallest body stature among all workers, reflected by his lowest height and among of the lightest weight. He also has the fewest working experience, as this business is his first job experience and only have been in for three years, as well as the youngest. These characteristics combined, could made the highest mental workload for Task 2. However, compared to worker in Task 5 in which the mean WWL value is the lowest, Task 5 worker has shorter work experience in the business. Although Task 5 worker only has been working in the business for one year, he has more years of experience in working in other similar businesses. Task 5 also has relatively lower ratings of the mental workload subscales as discussed previously, which could be caused by the relatively much less demanding (physically and mentally) than the other tasks. These findings on the highest and lowest value of mean WLL further highlights the possible influences of factors on workers' mental workload. Several possible factors include work and workers characteristics which have been discussed briefly on this paper, or other related factors. Such factors can include certain social, organizational, and technical factors which can give complex interaction in affecting mental load (López-López et al., 2018). Workers' age and experience, as discussed earlier, could results in certain level of expertise, which also influence mental workload (Causse et al., 2019).

Task 3 and Task 4 fall into the group of second highest WWL value of 67.33 and 65.33, respectively. As discussed earlier, that Task 3 and Task 4 involved important tasks of washing 2 and steaming 2 which determine the quality of final product of corn chips. In addition to the task demand, age and experience could contribute to the relatively high WLL of Task 3 and Task 4, in which Worker 2 of Task 3 was the youngest worker with lower work experience. Task 6 and Task 7 have similar mean WWL value of 46.67, reflecting similar mental workload experienced by the workers. Task 6 and Task 7 also shares similar value of ratings on each measured subscale. Examples of this are lower ratings on MD and P and higher ratings on TD and E, and exactly the same ratings on FL. Similarities of a subscale on various tasks are possible, representing similar interpretation or observation, as stated by Braarud (2020). Although Task 6 (flattening and drying) and Task 7 (sieving) were totally different tasks, the similar mean WWL value means that the workers felt the same level of mental workloads despite the differences of tasks.

4. Conclusion

This research was able to observe current state of workers' mental workload in Indonesian small food-producing business, particularly at a small-sized corn chips business as the research object. Although the exact levels of workers' mental workload were not determined due to lack of available guidance, overview of current conditions of worker's mental workload were presented. Measured NASA-TLX subscales varied among tasks and subscales, with indications of more physical tasks rather than mental. This was indicated by higher ratings of physical demand which reached 90, while the highest rating on mental demand was 70. Moreover, more mentally related subscales of temporal demand and frustration showed highest ratings of 80 and 70, respectively. These could also be indications of the mental workload experienced by the workers, and cannot be neglected. Subscale of effort, which measured physical and mental effort combined, further highlight indication of possible high mental workload as it reached rating of 90. Mean WWL values were in the range of 46.00 to 70.67, which further highlight variation of mental workload experienced by the workers among different tasks. The highest mean WWL value observed was on Task 2 with 70.67, while Task 5 has the lowest WWL value of 46.00. It is suggested that each of task's characteristics, tasks demand, and workers characteristics could have different influence to the observed mental workload subscales ratings and WWL.

This research results provides base of understanding and findings on states of workers' mental workload in Indonesian small food-producing business. It is expected that this research results and findings could instigate further related studies. While presenting preliminary findings on states of workers' mental workload, this research also demonstrated the practicality and easy-to-understand instrument of NASA-TLX to observe mental workload in Indonesian small food-producing business. Further utilization of NASA-TLX in similar workplaces with relatively unobserved mental workload conditions could be useful. However, some considerations on this research remain to be considered. First, is that the number of participants involved was relatively small. Although it was able to achieve this research objective, larger number of participants is suggested for future related studies. Second, while NASA-TLX was suitable for this research, future related studies may consider another method or instrument to offer further explanation and interpretation.

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