Measuring Fatigue for WFH Employee: Sofi Analysis

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Abstract. This article aims to predict the weariness experienced by Universitas Negeri Medan employees working from home owing to the COVID-19 pandemic. This study recruited 33 participants with the same workload. The Swedish occupational fatigue inventory (SOFI) scale was utilized to evaluate and predict fatigue. For reported mental and physical fatigue symptoms, severity of fatigue may be a viable mechanistic concept. Physical exertion (1.47), physical discomfort (1.20), lack of energy (1.95), lack of motivation (1.02), and tiredness were measured in this study (1.19). Thus, the five SOFI-dimensions accounted for more than half of the variance in the total evaluation of fatigue, and their internal consistency was satisfactory. However, the scores were on the lower end of the spectrum, and the correlation between the dimensions was greater than anticipated.

Keywords: Fatigue, work from home, Covid-19, SOFI analysis.

1 Introduction

On March 13, 2020, the United States declared coronavirus disease 2019 (COVID-19) a public health emergency, altering the way we work and live while also increasing stress levels and making many people anxious about the future. The widespread closing of businesses caused economic instability and the highest unemployment rates since 1976. According to the BLS (in the year 2020),. Mistrust and concern have increased as a result of the abundance of news coverage, some of which has been inconsistent or has changed over time [1]. Constant reminders of our "new normal," including wearing masks and keeping a safe distance from others, and constant advertising about handwashing and cleaning have been shown to increase stress and anxiety [2]. COVID-19 studies found that a range of factors, such as shifts in routine and routine disruptions at work, as well as worries about financial security and health, contribute to fatigue. Organizational safety measures (such as building safe work environments, designing sanitization routines, and providing employee aid programs) and clear communication regarding safety policies and procedures can be effective employer-led activities to prevent weariness (e.g., creating safe work spaces, developing sanitization routines, provision of employee assistance programs). Employees are encouraged to familiarize themselves with their employers' fatigue prevention initiatives, keep up with their normal, healthy routines, and build strong social networks (while protecting themselves and others) from harm (while protecting yourself and others). Today, more than ever, employers and workers need to work together on an integrated strategy and creative solutions to combat exhaustion on the job.

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Shift work, long work hours, and the ensuing sleep loss are common contributors to occupational fatigue. Many other things, such as stress, health, and health-related activities, can also contribute to fatigue [3]. Depression and other mental health illnesses have been linked to fatigue, which may also be a symptom during these periods. Inadequate sleep or poor quality sleep may also exacerbate depression and other mental health disorders [4]. Persistent insomnia is more likely among people who already have trouble sleeping, and sleep disturbances are common during times of stress [5]. Sleep deprivation is associated with an increased likelihood of developing post-traumatic stress disorder after experiencing significant stress. This is linked to an increase in sleep disruption, which in turn can lead to stress, mental health issues, poor sleep, and exhaustion [6].

Fatigue can increase the likelihood of fatigue-related accidents, like workplace injuries, by slowing reaction times, decreasing attention or focus, impairing short-term memory, and clouding judgment. Mistakes committed by tired people when operating machinery at work, making decisions about family matters at home, or driving a vehicle can all put others at risk of harm. Knowing what factors contribute to fatigue can help ensure everyone's health and safety.

From a clinical standpoint, it is essential to identify relevant explanatory variables when researching the effect of COVID-19-specific felt stress on mental health outcomes. For instance, mental and physical tiredness can set in if one has already used up their mental reserves to deal with the stresses of the present and has no access to the usual means of alleviating stress (such as social support, holidays, etc.). Extreme tiredness, drowsiness, irritability, discomfort, and mental and physical exhaustion are among symptoms of severe fatigue, a risk factor for poor psychological outcomes [7]. More stress, depression, anxiety, and substance abuse are all linked to greater fatigue [8]. It's also possible that exhaustion manifests itself in the midst of ongoing stress or anxiety.

This study aimed to investigate the potential moderating effect of fatigue severity on the association between COVID-19-related stress and physical health functioning, controlling for demographic variables and participants' own evaluations of their own health. Perceived health was used as a covariate to account for potential confounding effects of physical health on concerns linked to COVID-19. The severity of COVID-19's fatigue may indicate that it was under stress. This theoretical framework lends credence to the idea that the degree of fatigue may mediate the link between COVID-19-specific subjective mental and physical health symptoms.

It is therapeutically significant to recognize potential explanatory variables that may be implicated in the relationships between COVID-19-specific felt stress and mental health outcomes. For instance, physical and mental exhaustion may set in when one's mental reserves for dealing with current stressors are drained and when one has access to more conventional means of dealing with stress (such as social support, vacations, etc.). Severity of fatigue, which is defined as a pervasive feeling of weariness that contributes to reduced physical and/or cognitive functioning, is a risk factor for negative mental health outcomes [7]. Severity of fatigue is associated with elevated levels of stress, sadness, anxiety, and substance abuse [8] [9]. It's also speculated that persistent stress and anxiety may contribute to weariness [8].

This study aimed to examine whether or whether fatigue intensity, independent of demographic factors including age, gender, race, and self-reported health, may provide an explanation for the association between COVID-19-related stress and physical health functioning. To account for any confounding effects of physical health on COVID-19-related worries, we chose perceived health as a covariate to analyze. We postulated that COVID-19's sensitivity to stress would manifest itself in its characteristically severe weariness. This theoretical model therefore lends credence to the speculation that the perceived severity of mental and physical health problems associated with COVID-19 may be linked in part by tiredness severity.

1.1 Fatigue for workers

Fatigue refers to "an extreme feeling of weariness, loss of energy, or fatigue" [10]. Workers' health, productivity, and safety can all suffer from fatigue [11]. One population study demonstrated a negative correlation between chronic fatigue and wellbeing in Germany. Increased physical activity and decreased sitting time may alleviate subjective exhaustion on the job, even if the root causes of workplace fatigue remain unknown [12].

To give one example, a group of overweight and obese people's fatigue levels were found to be lowered when they alternated between long periods of sitting and walking breaks in a randomized controlled trial. Sitting for longer periods of time was also associated with increased fatigue in a sample of Swedish people. However, the majority of this data comes from cross-sectional studies of at-risk populations, such as overweight and obese individuals. More study is needed to see if shifts in workers' sedentary and active habits throughout time affect their fatigue levels. [13].

The World Health Organization declared a pandemic due to COVID-19 on March11, 2020. [14]. To stop the spread of COVID-19, governments and local authorities have now implemented a variety of social distancing techniques, including closing schools and universities, encouraging remote work, and prohibiting large public meetings. On April 7, 2020, a state of emergency was declared by the Japanese government in an effort to stop the spread of COVID-19. The governors of the prefectures were authorized to urge their constituents to stay put and avoid leaving their homes unless absolutely essential. Similarly, they asked that museums, theaters, and other public attractions cut back on their operating hours. Unlike in some other countries, Japanese legislation does not carry any legal implications for individuals or enterprises that disobey the lockdown order. But these practices of separation are probably going to have an effect on how much time people spend sitting and how much time they spend being physically active. A global examination of the effects of COVID-19 on physical activity found a dramatic drop in step counts across multiple countries [15].

Public health initiatives to reduce COVID-19 transmission from person to person may result in nonpharmaceutical practices that could have unintended consequences for people's exhaustion levels. A Polish study found that fatigue during the COVID-19 home quarantine period was much higher than before the quarantine period [16]. Workers may be obliged to observe social distance norms at the workplace for an indefinite amount of time due to the uncertainty of how long the COVID-19 epidemic will last. Worker inactivity is expected to persist after the pandemic has finished, thanks to technology advancements in the workplace. Further study is

needed to determine how COVID-19 has affected the sedentary behaviors and physical activities of different demographic groups, especially company employees who are already exposed to a sedentary lifestyle, given the links between weariness and an active lifestyle. The study is the first to use SOFY analysis to examine the effects of the COVID-19 outbreak on the sedentary behaviors and physical activity levels of company employees over time.

1.2 Fatigue for workers

The State-Outcome Fatigue Inventory (SOFI) is a self-report instrument with a multi-dimensional scale to measure fatigue [17]. Fatigue in MS is typically defined as a subjective lack of physical and/or mental energy that is perceived to interfere with usual and desired activities. Using factor analysis, 25 components were identified as representative of tiredness, and SOFI was then established with five dimensions of fatigue. Exhaustion, pain, tiredness, apathy, and drowsiness are the five dimensions of the State of Fatigue Index (SOFI). The number of components in these dimensions was reduced to 20, and a seven-point scale was developed for each. In their research, Ahsberg, Gamberale, and Kjellberg found that the SOFi dimensions—including fatigue, sore muscles, and strain—play a significant role in demanding physical activities. The physical discomfort dimension of the Short-Form Health Survey (SF-36) was shown to be most strongly correlated with static labor, while the physical exertion dimension was found to be most strongly correlated with dynamic work.

To better grasp the nature of fatigue, researchers in Sweden created the Swedish Occupational Exhaustion Inventory (SOFI) to examine the subjective aspects of fatigue in workers across industries. Twenty items make up the Fatigue, Exhaustion, Discomfort, Disinterest, and Sleepiness components of the SOFI [18]. All dimensions can be mapped onto ICF bodily functions. As a result, they may be able to assess facets of fatigue that are not measured by the FSS and other widely-used scales (Fatigue Severity Scale).
In conclusion, the detrimental effects of fatigue on everyday activities in patients with MS underscore the importance of identifying modifiable components through interventions. It is unknown which aspects of weariness are experienced by people with MS. Accordingly, testing an instrument that measures fatigue within specific contexts, such as physical functions, and that can differentiate between distinct aspects of weariness, is warranted in patients with MS.

a. Evaluate the reliability of the SOFI in a sample of MS patients with variable disease severity;
b. The SOFI's Capacity to Distinguish Between Types of Fatigue in Multiple Sclerosis Patients; and
c. Analysis of the relationships between the SOFI and the FSS dimensions.

2 Methodology

2.1 Participant

Thirty-three participants with at least two years of administrative and teaching experience were recruited from Universitas Negeri Medan to assemble submersible pumps for this project. The average age was 33.93, and they had been doing the job for an average of 10.33

years. Averaging 166.5 centimeters and 60.07 kilograms, the individuals were a healthy range of sizes. Everyone was a righty.

2.2 Data collection procedure

The necessary information was gathered by conducting scheduled, in-depth interviews. The eight-hour workday was broken up into four segments so that weariness could be measured and its temporal consequences could be analyzed. Assessments were conducted during the day shift (a) after two hours of work (just before the morning tea break), (b) after four hours of work (just before lunch), (c) after six hours of work (just before the afternoon tea break), and (d) after eight hours of work (that is, at the end of the shift). Employees were presumptively alert prior to the start of work. The eight-hour workday was broken up into two tea breaks of 15 minutes each and one longer lunch break of 30 minutes. All participants' levels of exhaustion were measured using the Subjective Effort Fatigue Index (SOFI). Linear and quadratic regression models were developed for predicting fatigue on unidimensional scales and the relevant aspects of the Short-Term Occupational Fatigue Inventory (SOFI). In addition, demographic-specific fatigue models were created.

3 Result

Table 1. Physical Exertion.

Physical Exertion	
Indicator	SOFI-scales
Palpilation	1.58
Sweaty	2.06
Warm	1.61
Out of breath	1.05
Heavily Breathing	1.09

After the analysis was complete, the coefficient of internal consistency, also known as Cronbach's a, was determined for each SOFIdimension and each measurement occurrence. In particular, the physical exertion dimension exhibited a relatively strong internal consistency (range = 1.47), which was one of the tiredness dimensions. These findings are the product of multiple indicators that were determined through the use of physical effort. One of these indications was palpation, which revealed the scales of SOFI at a value of 1.58, which is still regarded to be normal. The sweating indicator then displays a range of 2.06 scales of SOFI, which is regarded to be beyond the typical limit for the size of weariness. The third indicator is "warm," which demonstrates that the SOFI scale is currently 1.61. Then, from the scales of SOFI, an indicator of "out of breath" with a value of 1.05, suggesting that normal tends to be low, is followed by an indicator of "heavy breathing" with a value of 1.09.

Table 2. Physical Discomfort

Physical Discomfort	
Indicator	SOFI-scales
Tense Muscles	1.62
Numbness	0.61
Stiff Joints	1.39
Hurting	0.92
Aching	1.47

After the analysis was finished, the coefficient of internal consistency, commonly known as Cronbach's a, was calculated for each SOFI dimension and each measurement event. This was done after it was established that the analysis was accurate. Specifically, the bodily discomfort dimension, which was one of the exhaustion dimensions, displayed a somewhat normal internal consistency (range = 1.20). This was one of the key findings. These results are the culmination of the examination of several different indicators that required the expenditure of some effort physically. One of these warning signs was described as having "tight muscles," which prompted the SOFI scales to indicate a value of 1.62, which is still considered to be within the range of normal to strong. The "numbness" indicator then displays a range of 0.61 scales of SOFI, which is considered to be beyond the typical limit for the size of fatigue. This is because 0.61 scales of SOFI are considered to be beyond the typical limit. "Stiff joints" is the third indicator, and it reveals that the SOFI scale is now 1.39. The next item on the scales of SOFI is an indicator of "aching" with a value of 1.47. This follows an indicator of "hurting" with a value of 0.92, which indicates that normal tends to be low.

Table 3. Lack of Energy

Lack of Energy	
Indicator	SOFI-scales
Worn Out	1.67
Exhausted	1.95
Spent	1.97
Drained	2.2
Overworked	1.97

Upon completion of the analysis, the coefficient of internal consistency, also known as Cronbach's a, was determined for each SOFI dimension and measurement event. After it was determined that the analysis was accurate, this action was taken. Specifically, the physiological dimension, which represented one of the energy deficits, had a rather robust internal consistency (range = 1.95). This was one of the major conclusions. These results are the product of a physically demanding study of a variety of parameters. One of these warning

indicators was described as "worn out," causing the SOFI scales to reflect a rating of 1.67, which is nevertheless regarded as normal to strong. The "exhausted" indicator then indicates a range of 1.95 scales of SOFI, which is regarded as a size of fatigue that is believed to be severe. The final sign, "spent," tells that the SOFI scale is currently 1.97. The following item on the SOFI scales is a "drained" indicator with a score of 2.2. This follows a "overworked" signal with a value of 0.92, which suggests that typical tends to be over average.

Table 4. Lack of Motivation

Lack of Motivation	
Indicator	SOFI-scales
Lack of Concern	1.42
Listless	1.44
Passive	0.86
Indifferent	0.67
Uninterested	0.74

After verifying the accuracy of the analysis, the decision was made to proceed in this manner. The lack of motivation, which was a mental deficiency, had a high degree of internal consistency (range = 1.02). One of the most important findings was this. These findings are the end result of a strenuous investigation into many factors. The SOFI scales reflected a grade of 1.42, which is still considered normal to strong, due to one of these warning flags being classified as "lack of concern." The "listless" indicator therefore corresponds to a SOFI score of 1.44, which is considered to be a very high level of exhaustion. The SOFI scale is currently at 0.86, as shown by the final indication, passive. The following SOFI indication, with a score of 0.67, is neutral. This comes after a "uninterested" signal with a 0.92 value, which indicates that the norm is exceeded more often than not.

Table 5. Sleepiness

Sleepiness	
Indicator	SOFI-scales
Lazy	0.86
Falling Asleep	0.89
Drowsy	1.47
Yawning	1.47
Sleepy	1.3

After ensuring that the results of the analysis were correct, it was decided that we would proceed in the manner described above. A normal degree of internal consistency was present in the tiredness, which was caused by a physical insufficiency (range = 1.19). This turned out to be one of the most significant discoveries. These conclusions are the culmination of a laborious inquiry into a wide variety of contributing elements. Due to the fact that one of these red flags was categorized as "lazy," the SOFI scales indicated a grade of 1.42, which is still

regarded to be normal to low. The "falling asleep" indicator consequently equates to a SOFI score of 0.89, which is considered to be a low level of weariness. The current value of the SOFI scale is 1.47, which may be deduced from the fact that the last indication is "drowsy." The subsequent SOFI indication, which had a score of 1.47 for "yawning," is regarded as being unfavorable. This follows a "sleepy" signal that had a value of 1.3, which suggests that the norm is surpassed more frequently than it is not exceeded.

5 Conclusion

In conclusion, the features of the SOFI are the primary factor that lend support to the appropriateness of the SOFI for use among this particular set of participants. On the other hand, according to COVID 19, distinct fatigue dimensions were found to reflect how the participants felt about working from home. They were things like physical exertion, bodily discomfort, fatigue, a lack of energy, a lack of motivation, and sleepiness. According to the findings of this study, the rate of rise in time-related fatigue experienced by workers performing overhead assembly is decreasing. It has been discovered that the SOFI scale is more accurate than the SPFS when it comes to forecasting fatigue. When performing stationary assembly operations that involve overhead labor, it has been discovered that the PD dimension of SOFI is a more reliable indication of fatigue than the LE dimension. The chosen position appears to have a work design that is beneficial in reducing the amount of weariness experienced by employees while they are working from home.

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