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Factors Associated with The Length of Sick Leave Due to Covid-19

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Abstract

Background: Despite the COVID-19 pandemic, the workers in food manufacturing continue to work. The Government of Indonesia issued a regulation of 10-day isolation for those asymptomatic patients. This regulation implies long sick leave for workers with asymptomatic COVID-19 infection, leading to possible disruption in fulfilling target production. This study aims to understand the factors associated with the length of sick leave due to COVID-19 among food manufacturing workers.
Methods: The design of this study was cross-sectional, used 205 workers' data of confirmed COVID-19 infection, and returned to work from March 2020 – to August 2021. The data were obtained by the company medical team from medical resumes at the companies' clinics and then sent to *Ikatan Dokter Kesehatan Kerja Indonesia (IDKI) Banten*. The data was screened as inclusion and exclusion criteria and then analyzed by descriptive test. unpaired T-test and linear regression.
Results: The mean length of sick leave of 205 data was 19.3 (± 4,8) days. Treatment facilities, work shifts, and smoking were associated with the length of sick leave ($p<0.05$). Home Self-isolating, shift, and non-smoking workers had longer sick leave than workers treated at COVID center, non-shift, and smoking workers
Conclusion: The mean length of sick leave among food workers in Cilegon is 19.3 (±4,8) days. There is a significant relationship between the length of sick leave with treatment facilities, shift work, and smoking. Treatment facilities were the most dominant factor.
Keywords: COVID-19, novel coronavirus, length of sick leave, occupational health

Abstrak

Latar Belakang: *Sektor industri manufaktur makanan tetap harus berjalan di masa pandemic COVID-19 untuk menyediakan kebutuhan pangan masyarakat. Proses kerja perusahaan manufaktur makanan di kota Cilegon mengharuskan pekerja datang ke tempat kerja. Regulasi pemerintah Indonesia mengatur pekerja yang terinfeksi COVID-19 isolasi minimal 10 hari, pekerja tidak dapat masuk bekerja karena sakit yang disebut sick leave. Sick leave yang panjang dapat mengganggu produktivitas dan pasokan makanan masyarakat.Hasil penelitian ini diharapkan dapat memberi masukan bagi perusahaan untuk membuat kebijakan dalam menjaga produktivitas dan membantu pemerintah memenuhi kebutuhan pangan masyarakat.*
Metode*: desain penelitian ini adalah cross sectional menggunakan sampel 205 data pekerja manufaktur makanan yang terinfeksi COVID-19, data ini dikumpulkan oleh tim medis di perusahaan yang kemudian dikirimkan ke IDKI Banten. Data dari IDKI Banten diseleksi berdasarkan kriteria inklusi dan eksklusi. Sampel kemudian dianalisis dengan analisis deskriptif untuk melihat rerata lama sick leave, analisis bivariat dengan menggukanan uji T tidak berpasangan dan analisis multivariat dengan regresi linier.*
Hasil: *Rerata lama sick leave dari 205 pekerja perusahaan manufaktur makanan yang terinfeksi COVID-19 adalah 19.3 (±4.8) hari. Faktor resiko yang berhubungan dengan lama sick leave pada pekerja ini adalah faktor tempat perawatan, shift kerja dan merokok($p<0,05$). Tempat perawatan memiliki hubungan yang paling dominan.*
Kesimpulan: *Rerata lama sick leave pada pekerja manufaktur makanan di kota Cilegon adalah 19,3 (±4,8) hari. Ada hubungan yang signifikan antara lama sick leave dengan faktor tempat perawatan, kerja shift dan merokok. Faktor tempat perawatan adalah faktor yang paling dominan.*
Kata kunci*: COVID-19, novel coronavirus, length of sick leave, occupational health*

Introduction

The COVID-19 (Coronavirus Disease) pandemic had a great impact on the work sectors globally.[1] One of the sectors affected by COVID-19 was the food manufacturing sector which should be maintained to supply daily needs, hence, work from home policies are not suitable for this type of work. [2]

Workers infected with the COVID-19 require a certain period of treatment or self-isolation to prevent spreading the infection to other workers. [3] Sick leave means a condition that which the workers are unable to work due to illness but still receive the payment. [4] Long sick leave can disrupt productivity. [5]we analyzed Ibermutua records of all sick leaves during the first trimester of 2020, compared to during the same months of 2017, 2018, and 2019. We stratified the analysis by causes, patient sex, activity sectors, and regional data. All sick leaves were adjusted by the number of Ibermutua-affiliated persons in each period. Results: In March 2020, there was an unprecedented (116%. Overall, a one-percent increase in sickness absenteeism would decrease about 0.24% of productivity. [6] Nevertheless, the impact may differ depending on the type and size of the industries.

Patients infected with COVID-19 must stay in the house or an isolated area. The median time of isolation days is varied. According to Saro Abdella Ibrahim et al., the median of viral clearance from COVID-19 was 19 days, but the range was quite large around 2-71 days. [7] While the Indonesian Ministry of Health Regulations issued the regulation in which patients with asymptomatic COVID-19 need 10 days of isolation.[8]

Our study took place at Cilegon, a major industrial city, located around 102.3 kilometers from Jakarta, in Banten Province. Indonesia has around 20 food manufacturing companies located in Cilegon. The number of COVID cases in this area surged, particularly in the midst of 2020. Based on the report of *Ikatan Dokter Kesehatan Kerja Indonesia* (IDKI) Banten, there were around 365 food workers infected by COVID-19 during March 2020-August 2021.

The companies' criteria for return to work workers must have negative PCR tests, no symptoms, and normal chest x-rays. The essential workers need a different return to work rule post-COVID-19 infection because of the operational need. Workers who had three times between 2 days of positive PCR tests, worked in the open work area, had limited contact with other workers, and had non-reactive IgM Sars Cov-2 could return to work.

Factors associated with the length of sick leave due to COVID-19 are very important to figure out. The companies need all information from research that helps to reduce the length of sick leave to maintain productivity and workers' health.

Methods

This study design was cross-sectional on 205 data of workers infected by COVID-19 from three food manufacturing companies in Cilegon, West Java, Indonesia. The data was collected by the medical team from medical resumes at the companies' clinics, then sent to Ikatan Dokter Kesehatan Kerja Indonesia (IDKI) Banten, West Java, Indonesia. After getting the permit for data use, we screened the data based on inclusion and exclusion criteria. The inclusion criteria were workers confirmed of COVID-19 infection by PCR/IgM SARS Cov-2 that returned to work in March 2020-August 2021. The exclusion criteria were sick leave workers after confirmed recovery from COVID-19 (negative CPR/IgM Sars Cov-2).

The Sampling was taken by total sampling. The risk factors for length of sick leave are age, sex, smoking habits, comorbidities, place of care, work location, and shift work. [7] These factors can influence the immunity that is important to the duration of recovery. [7]

The sick leave period is defined as the period since the patients confirmed positive for COVID-19 by PCR test until they were tested negative for COVID-19 by PCR/IgM Sars Cov-2 test. Age means the worker's age based on the data, which we divided into two groups: ≤ 45 years and > 45 years. Gender was based on the data. Smoking habit was data of smoked workers or non-smoker workers. Comorbidities were data of workers who had or did not have hypertension, diabetes, obesity, chronic respiratory disease, liver disease, kidney disease, and autoimmune disease. The treatment facility was data of home self-isolation or COVID Center (hospital or isolation facility that is prepaid by the Indonesian government/companies). The work location was office and field. The work shift was data of shift workers and non-shift workers.

This study has ethical approval from the ethics

committee of the University of Indonesia number: KET.995/UN2.F1/ETIK/PPM.00.02/2021. The data is analyzed univariate to see the worker's characteristics, bivariate with independent T-test, and multivariate with linear regression using SPSS 20.0.

Result

We obtained a total of 205 data from food workers. The overall mean length of sick leave was 19.3 (±4.8) days. The majority of the infected workers were male, aged below 45 years old, smokers, had no comorbidities, worked in the field, and were non-shift workers.

Table 1. Individual characteristics of respondents

Variables	n	Percentage (%)
Age		
≤45 Years	188	91,7
>45 Years	17	8,3
Gender		
Male	190	92,7
Female	15	7,3
Smoking Habit		
Yes	76	37,1
No	129	62,9
Comorbidities		
Yes	17	8,3
No	188	91,7
Treatment Facilities		
Home Self-isolation	104	50,7
COVID Center	101	49,3

Based on table 2, The majority worked in the field and had no shift. The workers in fields usually move from one area to the other. More possibility to have interaction with other workers and surfaces.

Based on table 3 there was a significant relationship between sick leave and treatment facilities and smoking. The length of sick leave for workers treated in the COVID center, and non-smokers are shorter than treated by self-isolation, and smokers. There were no significant differences in the variables of gender, age, and comorbidities.

Table 2. Work Characteristics of Food Workers

Variables	Amount (n)	Percentage (%)
Work location		
Office	56	27.3
Field	149	72.7
Work Shift		
Shift workers	101	49.3
Non-shift workers	104	50.7

Table 3. Association length of Sick leave with individual and Occupational risk factors

Variables	Length of sick leave (days)	Mean Difference (CI 95%)	p
	Mean (SD±)		
Gender		0,5(-2,016-3,100)	0,7[T]
Male	19,3 (±4,8)		
Female	18,8(±5,6)		
Age		0,073(-2,343 – 2,490)	0,9[T]
≤45 Years	19,3(±4,9)		
>45 Years	19,2(±3,9)		
Comorbidities			
Yes	21,24(±4,9)	2,108(-0,533-4,748)	0,8[T]
No	19,13(±4,8)		
Smoking Habit		-1,5(-2,773 - -0,279)	0,017[T*]
Yes	18,3(±3,7)		
No	19,9(±5,3)		
Treatment Facilities		2,3(1,060 – 3,645)	0,000[T*]
Home Self-isolation	20,5(±5,4)		
COVID Center	18,1(±3,9)		

T) Unpaired T-test
*) significant

There was a significant difference in the length of sick leave associated with work shifts (p< 0.05). Those working in shifts had longer sick leave days compared to non-shift workers.

This multiple linear regression equation is obtained from: Length of sick leave due to COVID-19 = 21.7+(-2.140) work area+ (-1.394) (work shift) + 1,427 (smoking), depending on treatment facilities (1= Home self-isolation, 2= COVID center), shift work (1=yes; 2=

Table 4. Multivariate analysis relationship of the length of sick leave with individual and work factors

Parameter	Parameter estimate	Standard error	95% CI	P-value
Intercept	21.7	1.7	18.8-25.7	
COVID center	-2.140	0.7	-3.4- -0.9	0.001*
Shift worker	-1.394	0.7	-2.7- -0.1	0.033*
Smoking	1.427	0.7	0.1-2.7	0.034*

Note:
*) significant

No), smoking (1= yes, 2=No). The regression equation is: Y (sick leave length) = 21.7-2.140 (COVID center) -1.394 (shift workers) +1.427 (non-smokers) + e. R square=0.087.

This study design was not the best, the R square: 0.087 = 8.7%, means that this study could predict 8.7% of the relationship between the length of sick leave and place of care, work shifts, and smoking habit. There were about 91.3% of other variables that couldn't be predicted by this study design.

The length of sick leave had a significant relationship (p< 0.05) with the place of care, shift workers, and smokers. The place of care describes the quality of handling COVID-19. COVID-19 center has well-trained health workers, proper health facilities, and medicines. They can treat the infected workers adequately. Based on this research, the more adequate the treatment, the shorter the sick leave. Treatment facilities were the most related to the length of sick leave. The work shift had a significant relationship with the mean length of sick leave, shift workers are longer than non-shift workers. Smokers had a shorter length of sick leave compared to non-smokers.

Discussion

Relationship of Long Sick Leave with Individual Risk Factors

This study pointed out below individual risk factors have significant relationships with the length of sick leave:

• Treatment Facilities

Based on the place of care there was a significant difference (p<0,05) between the length of sick leave of the workers that home self-isolation (20.5±5.4 days) and treated at the COVID center (18.1±3.9 days). Workers treated at the COVID center had shorter sick leave possibly because of the proper facilities, medicines, and better monitoring. Analysis with linear regression found that the place of care had the most dominant relationship with other factors (smoking and work shifts).

Harizi et al reported that health workers recover faster than non-health workers, this may be related to better monitoring. [9] They also found that patients who are self-isolating recover faster than those in the COVID Centre. The Tunisian Government ruled that patients with severe symptoms will be treated at the COVID center, and the asymptomatic or mild symptoms will be self-isolated. (Harizi *et al.*,2021) This rule can help the patients to adequate treatment during the sickness. Indonesia has the same rule,(*Kementerian Kesehatan Republik Indonesia*, 2020) but in fact, many people infected with COVID-19 with moderate-severe symptoms did not want to be treated at the hospital for afraid of the pay, were isolated from their families, COVID-19 rule related to patriation (the family can't take care the death family caused of COVID-19). This condition could prolong the sickness due to inadequate treatment.

• Smoking

Smoking commonly causes damage to the respiratory tract, including pulmonary immune dysfunction, which can increase the infection severity and causes mortality.[11] This study found there were 76 smokers (36.9%) and 129 non-smokers (63.1%). There was a significant

difference in the length of sick leave compared to the smoking habit, the mean length of sick leave for smokers was 18.3 (±3.7) days while for non-smokers was 19.9 (±3.9) days, longer sick leave among the non-smokers. There were 68 of 76 (89%) smoking workers aged ≤ 45 years, 40 of 76 (53%) of them are non-shift workers, and 37 of 76 (49%) were treated at the COVID center. Young workers recovered faster than those aged >45 years.[20]

This condition was an anti-theory of respiratory tract infections in general. This study had limitations since there was no information about detailed smoking information such as the dose of smoking, and how long had been smoking, there could be uncontrolled bias or confounding factors that influenced this result.

Shariq Usman et al. reviewed the anty-theory smoking on COVID-19. Might be possible bias and broad confounding factors in studies that found nicotine reduced severity and mortality in patients with COVID-19. [12] Some hypotheses that need further research reported smoking causes chronic inflammation so that the immune response was less reactive (low production of pro-inflammatory cytokines) thus avoiding the cytokine storm. [13] In addition to the impact of increasing ACE-2 expression due to smoking, it can cause an increase in angiotensin-2 which causes vasodilation and reduces the inflammatory effect, reducing the risk of acute lung injury and thrombosis. [14] There was also an opinion that the high production of nitric oxide in smokers could inhibit viral replication or prevent the virus from entering the body. [12] The effect of smoking on COVID-19 still requires further research with better designs.

Length of Sick Leave Relationship with work-related Factors

In this study, shift work had a significant relationship with the length of sick leave. There were 104 (50.7%) shift workers and 101 (49.3%) non-shift workers. Shift workers were taking sick leave longer than non-shift workers. This result approves the theory that shift workers have more vulnerable immunity to infection and worsening the infection, this condition was related to the disturbed circadian cycle in shift workers and sleep disorder.[15]

The central nervous system controls the human circadian cycle, the suprachiasmatic and peripheral nuclei of every cell, including immune cells. Sleep is related to the immunological memory of innate and adaptive immunity. [16] Nakano et al found a decrease in the proliferation of T cell mitogens in shift workers. Mohren et al found that the common cold was more common in shift workers than non-shift workers. [15] Rowland et al reported a relationship between night shift workers and an increase in severe cases of COVID-19. (Rowlands *et al.*, 2021)

This study found out there was an association between length of sick leave due to COVID-19 and place of treatment, work shift, and smoking. The association with smoking resulted in an anti-theory can be related to the limitation of this study which there was no detailed information about how many and how long the workers smoked.

Conclusion

The results of the study among the food manufacturing workers infected with COVID-19 concluded that the mean length of sick leave among the food manufacturing workers infected with COVID-19 was 19.3 (±4.8) days. Treatment facilities, work shifts, and smoking were related to the length of sick leave for workers affected by COVID-19. Treatment facilities had the most dominant relationship compared to other factors.

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