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Who Are The Workers Impacted By The Covid-19 Pandemics? An Analysis of the National Labor Force Survey in Central Sulawesi

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Abstract

The Covid-19 pandemic is a global problem that has a negative impact on the employment sector. Many workers become unemployed or experience reduced working hours due to the impact of company policies. According to BPS (2020), in August 2020 the unemployment rate increased by 0.66 points or by 12.39 thousand people compared to the previous year. This problem also occurs in Central Sulawesi. This study examines individual characteristics and job characteristics inherent in workers in Central Sulawesi based on status affected by the Covid-19 pandemic. Using data from the National Labor Force Survey (Sakernas) and using a quantitative approach, this study examines the impact of the Covid-19 pandemic on workers based on their characteristics. We applied a descriptive analysis using a contingency table to calculate the proportion, relative risk (RR), and odds ratio (OR). The results obtained are that the workers affected by the COVID-19 pandemic are mostly adult workers, educated workers, formal workers, working in the tertiary sector, and coming from urban areas.

Keywords
impact; covid-19; workers; individual characteristics; job characteristics.

I. Introduction

The outbreak of the Covid-19 outbreak has become a concern for Indonesia, including the Province of Central Sulawesi. The spread of Covid-19 which continues to increase makes human mobility very limited. This health crisis has turned into a global economic crisis, which endangers health, jobs (ILO, 2020) and income reduction (Ngadi et al, 2020). The impact of Covid-19 in the first three months of the pandemic on the economy resulted in an unemployment rate that exceeded the great recession of 2008 (Kochhar, 2020). Many workers are laid off or laid off from their jobs, causing a reduction in income due to changes in working hours.

Many government policies have been implemented to reduce the spread of Covid-19, including the closure of regional borders and entry bans, policies to stop the operation of land, sea and air transportation modes, large-scale social restrictions (PSBB), calls for learning, working and worship activities that are carried out from home, as well as restrictions on other social activities. This restriction causes economic activity to decrease, causing a reduction in income due to changes in working hours and loss of income due to being laid off or laid off from work.Ministry of Manpower (2021) mentioned the main reason for the high number of layoffs due to companies collapsing due to the cessation of production activities and the implementation of PSBB

The Covid-19 pandemic that has spread widely in Indonesia is no exception in Central Sulawesi, which also has a health impact on the economic life of the community. UNDP (2020) said that Covid-19 had an impact on the economy, namely financial pressure due to a mismatch between income and expenditure which resulted in high unemployment, tax deferrals, and debt restructuring. The economic crisis has resulted in many people in the labor market being vulnerable to unemployment due to slowing economic growth. BPS noted that Central Sulawesi's economic growth in the second and third quarters of 2020 experienced the deepest economic contraction of 4.49 percent and 2.84 percent, respectively. There are 3 (three) business fields experiencing the largest contraction in Central Sulawesi, namely the transportation and warehousing business fields (33.12 percent); provision of accommodation and food and drink (11.05 percent); and construction by 8.47 percent(BPS, 2020b). In line with researchSusilawati et al., (2020) which stated that the transportation, tourism, trade, health and other sectors were the sectors affected during the COVID-19 pandemic.

The Covid-19 pandemic has also had a broad impact on the labor market in Central Sulawesi. The spread of Covid-19 in early March 2020 caused the number of unemployed to increase. Based on data from the National Labor Force Survey (Sakernas), the Open Unemployment Rate (TPT) in August 2020 increased by 0.66 percentage points to 3.77 percent compared to August 2019. The number of unemployed working age population in August 2020 was 59.38 thousand people or up about 12.39 thousand people compared to August 2019(BPS, 2020a).

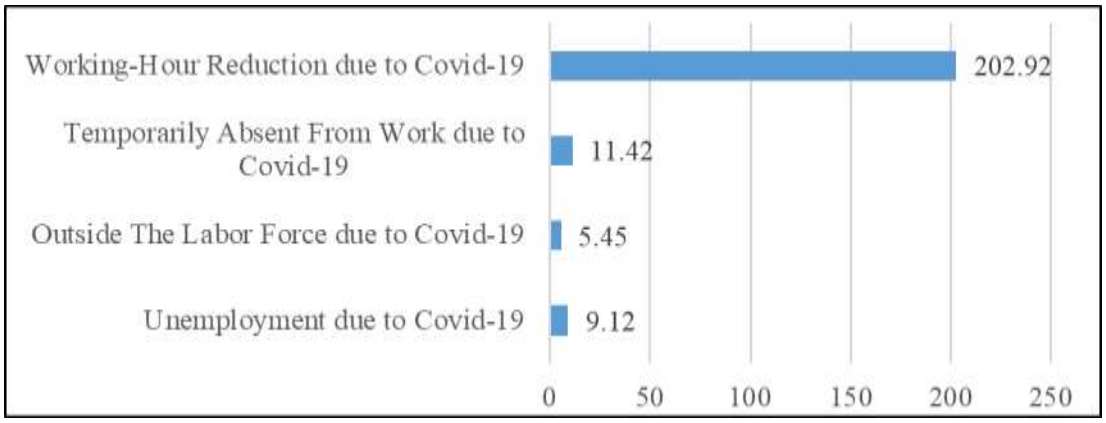

Figure 1. *Impact of Covid-19 on the Working Age Population (thousands of people)*
Source: BPS (2020)

In line with these conditions, there are 228.91 thousand people of working age affected by Covid-19. Consisting of unemployment due to Covid-19, outside the labor force (BAK) due to Covid-19, temporarily not working due to Covid-19 and working residents who experienced a reduction in working hours due to Covid-19. Figure 1 shows that the greatest impact felt by the working age population during the Covid-19 pandemic was experiencing a reduction in working hours. This shows that in addition to being faced with the problem of unemployment, the state of employment is also faced with the problem of underemployment, which is economically classified as working but working hours are below normal working hours which can have an impact on labor productivity (Khamis et al., 2021). Because the impact of Covid-19 is very diverse on the working age population, this study aims to analyze the population characteristics and job characteristics of workers affected by Covid-19 in Central Sulawesi Province.

II. Review of Literature

Several literature studies mention the influence of individual characteristics and work characteristics of the working population with a tendency to be affected by Covid-19. Shibata (2020) said that less educated and younger workers are always more severely affected by the global financial crisis and pandemic recession. Another thing to sayMacka et al., (2020) that older workers are more likely to be unemployed than younger workers and that college graduates in the formal sector tend to be more unemployed than workers in the non-formal sector (Astriani & Nooraeni, 2020).

ILO (2020) pointed out that the uneven impact of the crisis across various sectors could trigger a major adjustment of economic activity and job losses. If analyzed regarding the area of residence, several studies also mention that during the economic crisis, the characteristics of workers living in urban areas have a tendency to move into unemployment(Pasay & Indrayanti, 2012; Ulfah, 2016) and impact almost all formal sectors (Ozili & Arun, 2020). The sectors that experienced a very hard impact according toWorld Bank (2020) namely sectors with high contact intensity and work that is difficult to do over long distances such as transportation, hotel, wholesale and retail, construction, manufacturing.

III. Research Methods

3.1. Data collection

This study uses data from the National Labor Force Survey (Sakernas) of Central Sulawesi Province originating from the Central Statistics Agency (BPS). Sakernas is a survey conducted to collect data and information on employment in Indonesia. Sakernas aims to obtain estimated data on the number of working population, the number of unemployed, other employment indicators, as well as representative developments at the national, provincial, and district/city levels. This employment data is used to evaluate the achievement of sustainable development goals proclaimed globally through the SDGs. In addition, Sakernas data collected in August 2020 has a specific purpose, namely to obtain information on the impact of Covid-19 on employment in Indonesia.

The unit of analysis in this study was formed from a sample of individuals aged 15 years and over (working age) on the August 2019 Sakernas panel and the August 2020 Sakernas with the status of workers in 2019 to see the impact of Covid-19 in 2020. In the first stage, What is done is to determine individual panels of working age population from Sakernas August 2019 and Sakernas August 2020. Panel means that the same individual sample is used in Sakernas August 2019 and Sakernas August 2020. Furthermore, based on

the individual panels, working age residents are selected in 2019 with working status, so that the number of samples that become the unit of research analysis is 5,618 workers. For more details, the flow of determining the unit of analysis in this study is presentedin Figure 2 befollow

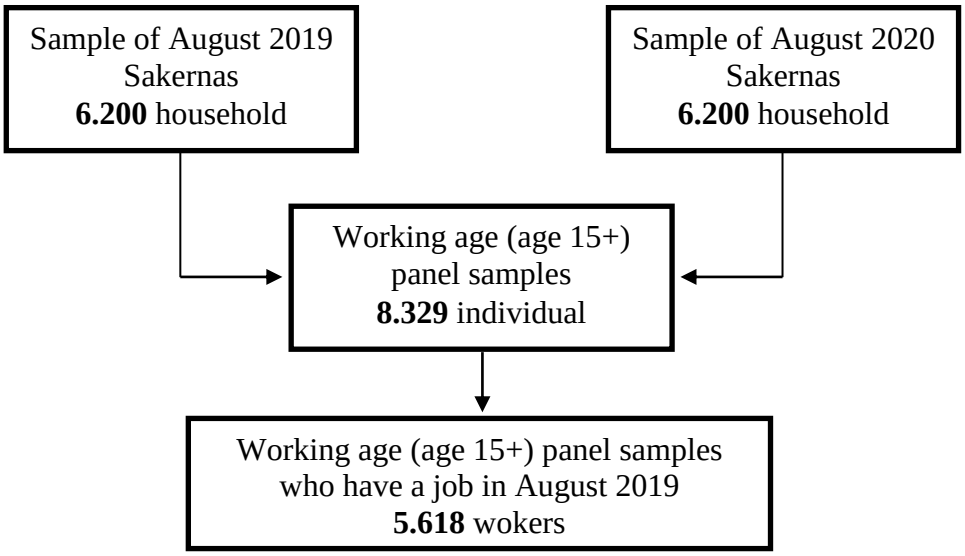

***Figure 2**. Plot Formation of Unit of Analysis*

In this study, the determination of the label of workers affected by the Covid-19 pandemic refers to publications issued by BPS, namely workers who have stopped working because of Covid-19, workers who are temporarily out of work because of Covid-19, and workers who have reduced working hours due to Covid-19. 19. Other workers are given the label not affected by the Covid-19 pandemic. This information was obtained from the details of the questions in the August 2020 Sakernas questionnaire. Meanwhile, the variables used to determine differences in the impact of the Covid-19 pandemic on workers came from individual characteristics and job characteristics. Individual characteristics consist of:

1. The age group consists of three groups, namely:
   - Young: ages 15-24 years.
   - Adults: 25-59 years old.
   - Old: age 60 and over.
2. Education level based on last diploma. The level of education is determined based on Law No. 20 of 2003 concerning the National Education System Article 14, which is categorized into three levels, namely:
   - Basic education: complete elementary school/equivalent and junior high school/equivalent.
   - Secondary education: completed at the SMA/SMK/equivalent level.
   - Higher education: graduated from university (Diploma, S1, S2, S3).

While the job characteristics consist of:

1. Job status is divided into formal and informal.
   - Formal workers are residents working with business status assisted by permanent/paid workers and employees/labourers/employees.
   - Informal workers are workers who are self-employed, trying to be assisted by temporary workers/unpaid workers, casual workers, and family/unpaid workers.
2. Sector is the field of activity of the job/business/company/office where a person works. This business/job field is based on the 2015 Indonesian Standard Classification of Business Fields (KBLI).
   - Primary sector consists of agriculture, forestry and fisheries, mining and quarrying sectors.

- The secondary sector consists of the manufacturing sector, the electricity and gas supply sector, the water supply sector, waste management, recycling waste, and the construction sector.
- The Tertiary sector consists of wholesale and retail trade, car and motorcycle repair, transportation and warehousing sector, accommodation and food and beverage supply sector, information and communication sector, financial and insurance services sector, real estate, corporate services, government administration, defense, compulsory social security, education services, health services and social activities and other services.

We have also added a classification based on place of residence which is divided into urban and rural areas to explain the workers most affected by the COVID-19 pandemic. So in this study will examine the five variables inherent in the characteristics of workers.

3.2. Methodology

This study uses a quantitative approach to describe the impact of the COVID-19 pandemic on workers. We apply a descriptive analysis using a contingency table to provide the proportions, relative risk (RR), and odds ratio (OR) presented using tables and graphs.

3.3. Contingency Table

Contingency table is a display format that is used to analyze and record the relationship between two or more categorical variables, where between one element and another element has compatibility, conformity here can be interpreted into the relationship or influence between the elements (variables).

Table 1. Contingency Table Format pxq

Variable 1	Variable 2				Amount
	1	2	...	Q	
1	f11	f12		f1q	n1.
2	f21	f22		f2q	n2.
…					…
p	fp1	fp2		Fpq	np.
Amount	n.1	n.2	...	Nq	n

3.4. Proportion

Proportion is a measure of the association of qualitative data that describes conditions between categories in row variables or in column variables. Proportions can be calculated from the data represented in the contingency table with percentages or fractions. If you want to know the conditions between categories in row variables, then the proportion to the total column is calculated. On the other hand, if you want to know the conditions between categories in column variables, the proportion to the total row is calculated.

- Proportion to total column = $\frac{f_{pq}}{n_{.q}}$
- Proportion to total row = $\frac{f_{pq}}{n_{p.}}$

In general, the proportion is the probability of occurrence of a variable.

3.5. Relative Risk (RR)

Relative risk is a measure of the comparison between two chances of a success event (risk). Risk is defined as the probability of an adverse outcome/event. In this context, workers are affected by the COVID-19 pandemic. The following is a formula for calculating relative risk.

- RR group 1 against group 2 = $\frac{Risk\ grup\ 1}{Risk\ grup\ 2} = \frac{f_{11}/n_{1.}}{f_{21}/n_{2.}}$

3.6. Odds Ratio (OR)

Odds ratio (OR) is calculated from odds. Odds are the probability that an event will occur compared to the probability that the event will not occur. The odds ratio is provided from the data set in the 2 x 2 contingency table(Sistrom & Garvan, 2004). The formula for the odds ratio is presented below.

- OR = $\frac{Odds_{exposed}}{Odds_{unexposed}} = \frac{\pi(1)/1-\pi(1)}{\pi(2)/1-\pi(2)}$

IV. Discussion

Based on the calculation of the Susenas panel sample in Central Sulawesi, 859 workers were affected by the Covid-19 pandemic from a total of 5,618 samples, so that the proportion of workers affected by Covid-19 was 15.29 percent and the remaining 84.71 percent were not affected. From the sample that has been labeled as affected and not affected, the proportion, RR, and OR will be seen based on the type of characteristics, namely individual characteristics, occupation and region (area type).

4.1. Workers affected by Covid-19 based on individual characteristics

Table 2 presents the number, proportion, risk, and odds of workers affected by the Covid-19 pandemic based on individual characteristics (age group and education level) and status affected by Covid-19. We use the proportion to the row total obtained by the sum in the cell divided by the total in the row containing it.

Table 2. Proportion, Risk and Odds of workers based on status affected by Covid-19 and characteristics individual

Characteristics		Impacted		Not Impacted		Total	risk	Odds
		Count	Percent	Count	Percent			
Age groups	Youth	56	10.11	498	89.89	554	0.10	0.11
	Adult	735	16.50	3,720	83.50	4,455	0.16	0.20
	Older	68	11.17	541	88.83	609	0.11	0.13
Education level	Basic	359	10.13	3,186	89.87	3,545	0.10	0.11
	Secondary	263	18.75	1,140	81.25	1,403	0.19	0.23
	University	237	35.37	433	64.63	670	0.35	0.55

According to age group, the sample is dominated by the adult age group, while the younger and older age groups are smaller with almost the same number. In terms of the characteristics of the education level, workers with a basic education level rank the most, followed by a secondary education level and then a higher education level.

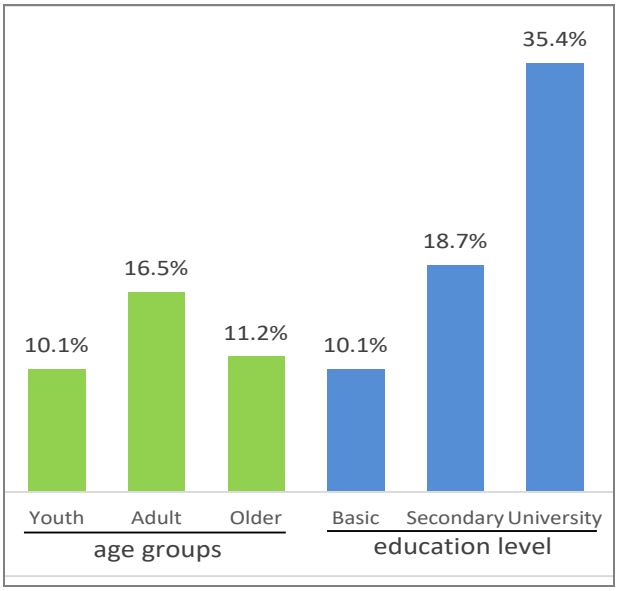

***Figure 3**. Proportion of workers affected by Covid-19 by age group and education level*

In Figure 3, the proportion of workers affected by Covid-19 by age group shows that adult workers have a higher proportion compared to young and old workers. The difference in the proportion of adult workers affected is 6.4 percent for young workers and 5.3 percent for older workers. This condition is not in line withShibata (2020)which states that young workers are more affected during a pandemic or recession. Figure 3 also presents the different proportions for the characteristics of the level of education, where the higher the level of education, the greater the chance of being affected by the Covid-19 pandemic. This is in line with the statementAstriani & Nooraeni (2020) that workers who graduated from college in the formal sector tend to be unemployed.

The relative risk (RR) for each characteristic is calculated by comparing the risk of the affected group to the risk of the unaffected group. Based on age group, youth have an RR of 0.64 affected by Covid-19 compared to others. While the RR for adults and the elderly are 1.55 and 0.71. This shows that adult workers have the greatest risk of being affected compared to other age groups. The calculation of the RR by education level shows that workers with basic education have an RR of 0.42, while workers with secondary education have an RR of 1.33 and a university education has the highest RR of 2.81. Therefore, the higher the level of education, the greater the risk of being affected by Covid-19. If the odds ratio (OR) of adult workers is calculated against other age groups, the OR value is 1.66, this means that adult workers have a 1.66 times greater chance of being affected than other age groups (young and old). Furthermore, the calculation of the OR of workers by education level results in the conclusion that workers with higher education have a 3.81 times greater chance of being affected compared to other levels of education.

4.2. Workers affected by Covid-19 based on job characteristics

Table 3 shows the number and proportion of workers affected by the Covid-19 pandemic based on job characteristics (employment status and employment sector). The number of workers based on formal and informal status has a significant difference. The number of informal workers in Central Sulawesi is twice as high as formal workers, this also applies to most other provinces in Indonesia. Nationally, in 2020, the number of formal workers in Indonesia reached 39.53 percent or in other words 60.47 percent for informal

workers. If it is reviewed based on business fields which are grouped into three main sectors, it can be seen that workers in Central Sulawesi work more in the primary and tertiary sectors. Workers in the secondary sector are only 13.96 percent.

Table 3. Proportion, Risk and Odds of workers based on status affected by Covid-19 and characteristics her job

Characteristics		Impacted		Not Impacted		Total	risk	Odds
		Count	Percent	Count	Percent			
Employment Status	formal	460	25.25	1.362	74.75	1,822	0.25	0.34
	Informal	399	10.51	3397	89.49	3,796	0.11	0.12
Sectors	Primary	189	7.12	2,467	92.88	2,656	0.07	0.08
	Secondary	130	16.58	654	83.42	784	0.17	0.20
	Tertiary	540	24.79	1,638	75.21	2,178	0.25	0.33

Figure 4 provides the proportion of workers affected by Covid-19 by employment status and sector. Based on employment status, formal workers have a larger proportion affected by the pandemic compared to informal workers. The difference in proportion is quite large, namely 14.7 percent. This is in line with the findingsOzili & Arun (2020)which stated that Covid-19 had an impact on almost all formal sectors. When compared to formal workers, informal workers are more flexible in changing the type of business depending on economic conditions(Pitoyo, 2007). This shows that informal workers are easier to survive in various conditions. Figure 4 also presents the different proportions for the characteristics of the employment sector, where the higher the level of employment (tertiary compared to secondary and primary, secondary compared to primary), the greater the opportunity to be affected by the Covid-19 pandemic. The value of the proportion of workers affected by the pandemic from the three has a significant difference.

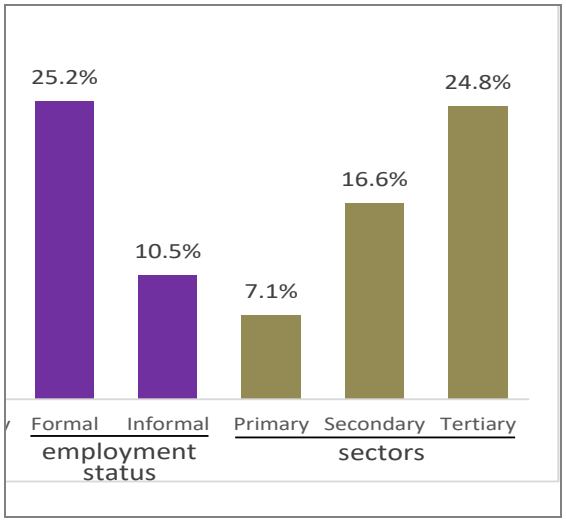

Figure 4*. Proportion of workers affected by Covid-19 by employment status and sector*

The calculation of RR based on employment status obtained that formal workers had an RR of 2.40 affected by Covid-19 compared to informal workers. On the other hand, the RR value of informal workers is 0.42. This shows that formal workers have a greater risk of being affected than informal workers. The results of the calculation of RR by sector show that the stratified values are getting bigger (0.31, 1.10, and 2.26) for the primary, secondary, and tertiary sectors. The higher the level of the employment sector, the greater the risk of being affected by Covid-19.

The calculation of the odds ratio (OR) of affected workers from formal workers to informal workers obtained a value of 2.88, this means that the tendency of formal workers to be affected by Covid-19 is 2.88 times greater than informal workers. Furthermore, the calculation of the OR of workers by sector results in the conclusion that workers in the tertiary sector have a 3.23 times greater chance of being affected compared to other sectors.

4.3. Workers affected by Covid-19 based on regional characteristics

The number and proportion of workers based on status affected by the Covid-19 pandemic and regional characteristics are presented in Table 4. The sample of workers in Central Sulawesi is more in rural areas than urban areas, this is a representation of the population in Central Sulawesi where people living in rural areas are more than urban areas. Another thing that supports this statement is that the proportion of villages with urban status is only 20 percent of the total villages in Central Sulawesi.

Table 4. Proportion, Risk and Odds of workers based on status affected by Covid-19 and characteristics the territory

Characteristics		Impacted		Not Impacted		Total	risk	Odds
		Count	Percent	Count	Percent			
Area Type	urban	324	27.32	862	72.68	1,186	0.27	0.38
	Rural	535	12.07	3,897	87.93	4,432	0.12	0.14

The difference in the proportion of workers affected by Covid-19 by type of area is shown in Figure 5. Workers in urban areas have a greater chance of being affected by the Covid-19 pandemic than workers in rural areas, with a difference in proportion of 15.2 percent.

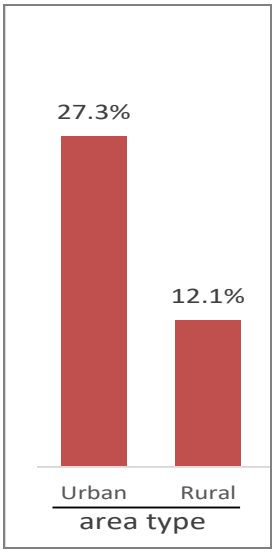

***Figure 5**. Proportion of workers affected by Covid-19 by area type*

The calculation of the RR of workers affected by the pandemic by area type obtained a value of 2.26 for workers in urban areas compared to workers in rural areas. On the other hand, for affected workers in rural areas, the RR value is 0.44. Therefore, workers from urban areas have a greater risk of being affected by the pandemic than workers from rural areas. Furthermore, the calculation of the OR by type of region resulted in the conclusion that the opportunity for workers in urban areas was 2.74 times greater to be affected by the COVID-19 pandemic than workers in rural areas.

V.Conclusion

The Covid-19 pandemic has had an impact on workers in Central Sulawesi. Most of the workers affected by Covid-19 have experienced stopping work, temporarily not working, and experiencing reduced working hours due to Covid-19. In terms of individual characteristics in age group variables, adult or older workers have a greater risk of being affected by the Covid-19 pandemic than younger workers. Furthermore, on the education variable, the majority of workers with higher education graduates are more likely to be affected by the Covid-19 pandemic. This happens because during the pandemic, many companies reduce the number of employees, so that more workers, especially college graduates, are increasingly affected. Other matters related to job characteristics, Formal workers are more affected by the Covid-19 pandemic than informal workers, and workers who work in the tertiary and secondary sectors tend to be more affected by the Covid-19 pandemic than the primary sector. Then by region, workers who live in urban areas are more affected than those who live in rural areas.

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