

# Psychosocial Risk Factors on Mining Workers Processing Copper and Gold Minerals during Covid-19 Pandemic

## *Faktor Risiko Psikososial Pada Pekerja Tambang Pengolahan Mineral Tembaga dan Emas pada Kondisi Pandemi Covid-19*

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### ABSTRACT

**Introduction:** In the era of the Covid-19 pandemic, psychosocial issues as part of health and safety have become a popular mental health issue, particularly among gold and copper miners. This situation has led some companies to fire their unskilled and unproductive workers to minimize the production costs. However, there is no specific regulation for the workers that could be a barrier of this unpredicted situation. This condition mostly becomes a negative stressor for the workers at the jobsite. At some point, it develops to a critical health and safety condition known as risky and unhealthy behavior that brings to fatality. The aim of this research is to analyze the psychosocial risk factors that adversely affect the psychology of copper and gold mining workers during the pandemic. **Method:** This is a cross-sectional study with COPSOQ III, used to identify factors contributing to workers' psychology, while Dolan & Arsenault's questionnaire was used to analyze stress symptoms, with a Cronbach  $\alpha$  value of 0.83-0.84. **Results:** Multivariate tests were conducted on the variables of work experience, body mass index, marital status, emotional demands, vertical trust, and organizational justice. Significance values were obtained for the variables of work experience (0.590), body mass index (0.517), marital status (0.122), emotional demands (0.187), vertical trust (0.000), and organizational justice (0.119). Of the six variables, only vertical trust had a significant value. **Conclusion:** Psychological risk factors on copper and gold mining workers during the pandemic are only influenced by a vertical trust.

**Keywords:** COPSOQ III, leadership, pandemic, psychosocial, vertical trust

### ABSTRAK

**Pendahuluan:** Di era pandemi covid-19, isu psikososial sebagai bagian dari kesehatan dan keselamatan menjadi isu kesehatan mental yang populer, khususnya di kalangan penambang emas dan tembaga. Situasi ini membuat beberapa industri memutus hubungan kerja pada pekerja yang tidak terampil dan tidak produktif untuk meminimalkan biaya produksi, sementara itu tidak ada peraturan khusus untuk pekerja yang dapat menjadi penghalang situasi yang tidak terduga ini. Kondisi ini sebagian besar menjadi stressor negatif bagi pekerja di lokasi kerja. Pada titik tertentu, itu berkembang menjadi kondisi kesehatan dan keselamatan kritis yang dikenal sebagai perilaku berisiko dan tidak sehat yang membawa kematian. Penelitian ini bertujuan untuk menganalisis faktor risiko psikososial yang berdampak buruk pada psikologi pekerja tambang tembaga dan emas selama masa pandemi. **Metode:** Ini adalah studi cross-sectional dengan copsoq III yang digunakan untuk mengidentifikasi faktor-faktor yang berkontribusi terhadap psikologi pekerja, sedangkan kuesioner Dolan & Arsenault digunakan untuk menganalisis gejala stres, dengan nilai  $\alpha$  Cronbach sebesar

0,83-0,84. **Hasil:** Uji multivariat dilakukan pada variabel pengalaman kerja, indeks massa tubuh, status perkawinan, tuntutan emosional, kepercayaan vertikal, dan keadilan organisasi. Nilai signifikansi diperoleh untuk variabel pengalaman kerja (0,590) indeks massa tubuh (0,517), status perkawinan (0,122), tuntutan emosional (0,187), kepercayaan vertikal (0,000), dan keadilan organisasi (0,119). Dari keenam variabel hanya vertikal kepercayaan memiliki nilai yang signifikan. **Simpulan:** Faktor risiko psikologi pada pekerja tambang tembaga dan emas selama masa pandemic hanya dipengaruhi oleh kepercayaan vertikal.

**Kata kunci:** COPSOQ III, kepemimpinan, pandemi, psikososial, kepercayaan vertikal

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## INTRODUCTION

The World Health Organization (WHO) defines the workplace as a space with physical, psychological, social, and organizational conditions that protect and enhance the overall health of members (Stoewen, 2016). According to Law No.1 of 1970 on Work Safety, the workplace is any closed, open, temporal or permanent room/field where laborers frequently enter to carry out businesses. Furthermore, it is stated that the dangers associated with a workplace consist of chemical, physical (mechanical, electrical, loose energy), biological, ergonomic, and psychosocial factors (Lestari *et al.*, 2020). Based on the Ministry of Manpower of the Republic of Indonesia (2018) on Occupational Safety and Health in the Work Environment, psychosocial factors affect employment activities, caused by interpersonal relationships in the workplace, roles and responsibilities towards work.

Psychosocial problems are common in the mining industry, and these affect workers' welfare as well as the safety of the workplace (International Council on Mining & Metals, 2020). Therefore, companies need to strive to support physical and psychological safety, which is also driven by high costs, increased periods of absence, and high payments of medical, legal, and other claims (Davidescu *et al.*, 2020).

Several studies have found significant cost losses due to psychosocial problems. For instance, The Minerals Council of Australia in accordance with the Scheme for Psychosocial and Wellbeing stated that companies lose between \$ 320-450 million per year due to worker absenteeism (Carlisle and Parker, 2014; The Australian Institute of Health and Welfare, 2021; Minerals Council of Australia, 2015). According to the National Psychosocial and Wellbeing Survey released by the Australian Bureau of Statistics, one in five Australian adults is likely to

have psychosocial problems for at least 12 months (The Australian Institute of Health and Welfare, 2021). The estimated loss incurred by a country due to psychosocial factors ranges from \$ 221.3 million to \$ 187 billion, with an individual loss of \$ 17.79 to \$ 1,211.8 (Hassard *et al.*, 2018). Psychosocial problems do not only occur in the mining industry as individuals also experience them due to prolonged time away from home, long working hours, economic demands, reduced number of workers, and social isolation (International Council on Mining & Metals, 2020; Minerals Council of Australia, 2015; Bowers *et al.*, 2018)

Companies need to take adequate care of workers with psychological problems and ensure those affected are properly treated because they are essential factors to the success of any organization. Generally, mining companies are located in remote areas with limited access, so with the emergence of the Covid-19 pandemic, employees are at risk of transmitting the virus to other people, due to communication with the outside environment. Currently, several mining companies in Indonesia have been forced to shut down due to the increasing number of employees infected with Covid-19 (Naciri *et al.*, 2020).

The World Health Organization has issued a Covid-19 guideline that regulates the implementation of hygiene protocols in public facilities. This has forced several mining companies to close their recreational facilities, such as karaoke, fitness centers, sports fields, swimming pools, restaurants, etc. The closure of these facilities, which are intended as recreational centers for employees on-site tends to affect their psychology negatively. Furthermore, the impact of the restrictions on public facilities and health protocols implemented by the local government has also affected the periodic leave system in several mining companies. These restrictions also consider the economic factors, such as additional costs for the mandatory PCR or rapid test before travelling and the availability of transportation, which needs to limit the capacity up to 50%. Several mining companies located in remote

areas have also been forced to extend the periodic leave system for their employees (Ramdo, 2020).

The Covid-19 pandemic has forced the mining industry to rapidly adapt to changes, with several companies conducting internal restrictions to maintain production stability using available health facilities. One of the methods used is determining and mandating the non-essential employees to work from outside the jobsite. Some companies have also terminated the employment contracts of some non-essential workers. This is certainly a stressor for employees who are currently still actively working on the jobsite. Therefore, this study aims to explain the psychosocial description and the factors that contribute to the psychology of copper and gold ore processing workers during the Covid-19 pandemic.

## METHODS

This research has been tested by the Health Research Ethics Commission of the Hang Tuah School of Health, Pekanbaru with the ethical test number 209/KEPK/STIKes-HTP/IV2021. This research used a cross-sectional design carried out on mining workers processing copper and gold minerals from May to June 2020 to examine the factors contributing to workers' psychology during the pandemic. The cluster random sampling method was used to obtain data from 109 workers out of a total of 1,332, as shown in Table 1. The instrument used to carry out this research was The Copenhagen Psychosocial Questionnaire COPSOQ III, which identified factors that contribute to the workers' psychology during the pandemic (Burr *et al.*, 2019). Furthermore, the Dolan and Arsenault's questionnaire was used to identify the emotional psychological and behavioral symptoms of stress. The instrument was tested with Cronbach's  $\alpha$  results in the range of 0.83 - 0.84, while the components of the questionnaire resulted in variables ranging from 0 - 10 for each subscale. The components of the questionnaire were also dichotomized using the median of the reference sample as the cutoff point to indicate high and low exposure levels. Meanwhile,

**Table 1.** The Sample Distribution

Section	Sample (person)
Maintenance	60
Technical Services	25
Operation	18
Resource Management	6

for emotional, psychological, and behavioral symptoms based on the Dolan and Arsenault's questionnaire, the value was below 4, which means that the sample was in a normal condition and when it was above four, the sample was in a moderate-high stress.

Multiple logistic regressions were used to examine the relationship between individual characteristics and psychological factors. In the first step, all variables were entered into the bivariate selection to determine the variables to be included in the multivariate model. Six variables had a p-value <0.25, namely work experience, body mass index, marital status, emotional demands, vertical trust, and organizational justice, with the ENTER method used to determine the results of multivariate analysis.

## RESULTS

Table 2 describes the sample characteristics used in this research, with participants more likely to come from contractors, with the same work experience or under five years, had a normal body mass index, and were married. Psychosocial factors are described in Table 3, which shows that there were 17 variables regarding psychosocial factors with a frequency distribution above 50% in the high classification. These included quantitative demands, work pace, influence at work, development possibility, recognition, role conflict, leadership

**Table 2.** The Distribution of Demographic Characteristic of the Sample

Variables	N (person)	%
<b>Body Mass Index</b>		
Risky	71	65.1
Not Risky	38	34.9
<b>Work Experience</b>		
> 5 years	35	32.1
< 5 years	74	67.9
<b>Marital Status</b>		
Single	31	28.4
Married	78	71.6
<b>Employee status</b>		
Company's Employee	39	35.8
Contractor's Employee	70	64.2
<b>Age</b>		
< 35 years old	43	39.5
> 35 years old	66	60.5

**Table 3.** The Distribution of Psychosocial Factors

Variable	Low		High		Variable	Low		High	
	n (person)	%	n (person)	%		n (person)	%	n (person)	%
Quantitative demands	48	44.0	61	56.0	Meaning of work	63	57.8	46	42.2
Work pace	50	45.9	59	54.1	Predictability	71	65.1	38	34.9
Emotional demands	55	50.5	54	49.5	Recognition	51	46.8	58	53.2
Influence at work	32	29.4	77	70.5	Role clarity	54	49.5	55	50.5
Role conflicts	48	44.0	61	56.0	Job insecurity	43	39.4	66	60.6
Quality of leadership	51	46.8	58	53.2	Burnout	46	42.2	63	57.8
Job satisfaction	36	33.0	73	67.0	Stress	57	52.3	52	47.7
Work life conflict	47	43.1	62	56.9	Somatic stress	50	45.9	59	54.1
Vertical trust	48	44.0	61	56.0	Cognitive stress	63	57.8	46	42.2
Organizational justice	61	56.0	48	44.0	Depressive symptoms	53	48.6	56	51.4
Insecurity over working condition	52	47.7	57	52.3	Possibilities for development	51	46.8	58	53.2
Social support from colleagues	45	41.3	64	58.7	Social support from supervisor	76	69.7	33	30.3
Self-rated health	29	26.6	80	73.4	Sleeping trouble	54	49.5	55	50.5
Sense of community at work	68	62.4	43	39.4					

**Table 4.** The Multivariate Analyses of Individual Characteristics and Psychosocial Factors

	Initial Sig. Value	Initial Odds Ratio	Final Sig. Value	Final Odds Ratio
Work Experience	0.089	0.336	0.590	0.313
Body Mass Index	0.517	1.470	0.517	1.470
Marital Status	0.101	4.195	0.122	3.372
Emotional Demands	0.172	0.373	0.187	0.390
Vertical Trust	0.002	9.775	0.000	14.434
Organizational Justice	0.116	2.656	0.119	2.602
Constant	0.034	0.006	0.017	0.006

quality, social support from colleagues, job insecurity, working conditions, job satisfaction, work-life conflicts, vertical confidence, personal health, fatigue, somatic stress, and depressive symptoms.

Table 4 shows the results of multivariate analysis of individual characteristics, psychosocial

factors, and vertical trust. Furthermore, vertical trust was the only variable that had a significant relationship with leadership quality, which is one of the components that often appears when the bivariate test is conducted. Apart from leadership factor, psychosocial factors are also interesting factors to study during an emergency situation, such as this

pandemic era. This can be seen in the significance value below 0.05 and the odds ratio changing by more than 10%.

Statistical analysis showed that there was an insignificant relationship between the variables of work experience, body mass index, marital status, emotional demands, and organizational justice with leadership quality. The results of the analysis from an interpersonal and organizational point of view indicated that only one variable had a significant relationship with leadership quality, namely, vertical trust.

## DISCUSSION

The lack of preparedness to face the Covid-19 pandemic has led to various changes in policy. Policies that change frequently cause confusion among employees. The company has carried out various kinds of mitigation to break the chain of distribution in the jobsite area, such as temporarily changing employee leave policies, implementing curfews, prohibiting visits to other employees' accommodation, closing public areas in the jobsite such as gyms, restaurants, and playgrounds. However, these efforts have made vertical trust the biggest issue.

Vertical trust is defined as a dynamic interpersonal relationship between individuals, with unique implications in the workplace. Employees perceive trust in organizations as a global evaluation process, with positive expectations of oneself in risky situations (Jain, 2016; Lewicka and Pec, 2019). Vertical trust is generally more complex than the horizontal one because it involves power and control, which has a significant impact on subordinates (Hasche, Höglund and Mårtensson, 2020).

The relationship and a character-based perspective are used to describe how trust in a leader or supervisor affects performance. These are important variables used to regulate employee relations and interpret managerial behavior (Guinot and Chiva, 2019). Furthermore, the relationship is a character-based perspective, which functions as a decisive performance moderator between leaders and employees (Chen *et al.*, 2018). Trust in leaders is also considered a predictor of team performance because it improves organizational functioning, effectiveness, and performance. Similarly, mutual trust is capable of driving team performance because it requires greater interdependence, initiatives, and positive interactions (Guinot and Chiva, 2019; Carter and Mossholder, 2015).

Employees perceive leaders as those with competence, virtue, and integrity. A leader is meant to perform effectively by influencing others through their excellent competency, genuine concern (virtue) and actions according to their word (integrity) (Engelbrecht, Heine and Mahembe, 2017). Several studies have shown that leadership practices affect the trust of subordinates by providing information about the character or relationship between the subordinates with their leader. Some of the questions that arise are:

Is the leader competent?

Does the leader have integrity?

Does the leader show concern to their subordinates?

Is the leader open and receptive to criticism?

Leaders generate team trust by building knowledge and expertise, as well as providing technical expertise, advice and up-to-date knowledge, such as disseminating newly published technical reports from the Ministry of Energy Mineral Resource. This practice demonstrates the leader's competence, thereby increasing the team's willingness to rely on their professional knowledge, skills and judgment; this will eventually build building dependency-based trust that affects team members' perceptions (Engelbrecht, Heine and Mahembe, 2017; Bligh, 2017).

Leadership is described as an interactive relationship between individuals in which one person exerts more influence (a leader) than others. Successful leaders are those capable of influencing the behavior and activities of group members. Emotional intelligence, communication, empathy, creativity, and vision are all factors that contribute to leader effectiveness. Individuals tend to follow leaders they can trust and make them feel safe. Employee trust in a leader is associated with the leaders' ability to make the employees believe in their words, actions, and decisions. This shows that when trusting a leader, followers become more vulnerable to being influenced by their actions. Given the importance of trust in understanding leadership, it is surprising that the literature on this topic is relatively sparse (Rosari, 2019; Stedham and Skaar, 2019).

Basically, a leader of an organization is expected to be able to change and invite others. Leaders need to use a persuasive approach and positive encouragement in leading the organization and need to be able to provide solutions to problems. Leaders also need to understand their followers' need and make it a stimulus in achieving organizational goals.

One of the important and often overlooked factor in leadership principles is how leaders can identify and reward their followers (Latif, 2018; Karasel *et al.*, 2018).

It is necessary to develop the leadership potential of all employees in an organization by having strong, responsible and empowered staff for improved performance. Leadership cannot rely solely on the top leaders in the organization, but rather it can be practised at all levels of the organization, irrespective of the job function or length of service of the employees in their positions. Strategic leadership is associated with thinking and acting especially when facing a conflict/challenge, such as changes that occur due to the Covid-19 pandemic. This means that an organization needs to empower employees to become leaders and develop a "leadership mindset" in workers.

## CONCLUSION

This research found that vertical trust was the only psychological risk factors that affected workers, while the other factors were not significant because this research was conducted at the beginning of the Covid-19 pandemic, with many policies changing and employee trust to supervisors decreasing.

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