



Analysis of Risk Factors for Respiratory Disorders In Employess at PTPN IV Regional I Kebun Bandar Besty

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ARTICLE INFO

Article history

Received : 30 November 2025

Revised : 30 December 2025

Accepted : 31 December 2025

Keywords

PPE

Respiratoty Disorder

Smoking Habit

Work Period

ABSTRACT

Industry development in Indonesia has experienced a significant increase in recent years, one of which is the growth of the rubber processing sector. One of the business conditions that has the potential to endanger lung health is the rubber processing production sector. The purpose of this study was to identify variables related to complaints from employees in the production division of PTPN Regional IV Kebun Bandar Betsy. This study used a cross-sectional study design, and quantitative research through analytical investigation. All employees in the rubber processing production division total 73 rubber processing factories became the study population, the total sampling procedure was used to select a sample of 73 respondents from December 1 to December 31, 2023. Research Analysis Using the Chi-Square test, data analysis was carried out univariately and bivariately. The results of the statistical test showed that the p-value (0.023), there was a relationship between work experience and complaints of respiratory disorders, the p-value (0.011) there was a relationship between smoking habits and complaints of respiratory disorders, the p-value (0.006) between the use of personal protective equipment and complaints of respiratory disorders. Based on the results of the study, employees of the rubber processing production of PT. reported respiratory disorders related to length of service, smoking habits, and use of personal protective equipment. Therefore, the recommendation is to provide training on occupational health hazards in the rubber processing industry, as well as safe techniques and procedures to avoid health risks, including the correct use of PPE

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INTRODUCTION

When there is a disturbance in the respiratory system, the body cannot take in enough oxygen from the lungs, thus triggering a deadly disease known as respiratory disorders (STIKES Kendal et al., 2023). One of the health problems that workers in rubber processing factories with high dust levels often experience is difficulty breathing. Dust that accumulates in the respiratory tract can affect the respiratory system and trigger symptoms of respiratory problems such as coughing and shortness of breath (Mufti Azzahri Isnaeni and Masyarakat Universitas Pahlawan Tuanku Tambusai, 2023)

According to estimates by the International Labor Organization (ILO), the causes of worker deaths show that the causes of worker-related deaths (34%) are cancer, accidents (25%), respiratory tract diseases (21%), cardiovascular diseases (15%), Other factors (5%) (Rukevwe and Nwachukwu, 2023). Worker deaths due to respiratory diseases rank third after work accidents. Deaths due to respiratory diseases accounted for 6.7% (347,867 cases) of all deaths in the European Union in 2020. The proportion of deaths in Malta, Denmark and Ireland due to respiratory diseases was much higher, namely 10.5%, 10.4% and 10.0%. In Indonesia, the Risesdas report has highlighted the prevalence and characteristics of respiratory disorders in the population, providing important insight into efforts to prevent, early detect and treat these conditions. Based on 2018 Risesdas data, the prevalence of respiratory disorders in Indonesia includes asthma at 2.4%, *pneumonia* at 2.2% and acute respiratory infections at 4.4%. This confirms that respiratory disorders remain a serious concern in the context of public health in Indonesia (Ryanti *et al.*, no date). Apart from that, if we review prevalence data at the regional level, North Sumatra also faces serious problems related to respiratory disorders. The prevalence of respiratory disorders in North Sumatra in the same year showed quite significant levels, with asthma at 1.04%, *pneumonia* at 2.09%, and acute respiratory infections at 2.76%. (Dinas Kesehatan Provinsi Sumatra Utara, 2018)

Occupational respiratory disorders and non-occupational respiratory disorders often cannot be differentiated clinically, but are differentiated from each other based on etiology. If workplace exposure causes or worsens a respiratory illness, it is considered an occupational disease. Respirable dust from coal mines, silica, smoke, vapors, gases, volatile organic compounds, man-made glass fibers, chemicals, metals, and infectious pathogenic materials are examples of exacerbating exposures. A variety of respiratory conditions that are similar to those that occur outside the workplace are included in work-related respiratory disorders. The most frequently diagnosed condition is occupational asthma. Acute and chronic diseases include other occupational respiratory diseases, ranging from hypersensitivity pneumonitis, chronic obstructive pulmonary disease (COPD) to pulmonary fibrosis (Vlahovich and Sood, 2021). Conditions called respiratory complaints can impact the tissues and organs involved in gas exchange circulation, causing instability in the respiratory system from the nose to the alveoli and other organs. Because the respiratory tract is essentially one of the areas most frequently exposed to easily inhaled pollutants that are widely found in the environment, respiratory tract disorders often occur and are strongly correlated with the duration of exposure to certain dust (Nurliana, 2024). Shortness of breath, frequent phlegm, fatigue, and coughing are common symptoms of respiratory problems. Symptoms may worsen as the disease progresses, and if this occurs, respiratory failure and even death may occur (Ambiya, 2022).

Respiratory illnesses can occur in workers who are exposed to workplace contaminants. Age, previous health history, work period, which influences the length of time workers are exposed to pollutants, smoking habits, and the use of masks and other personal protective equipment are factors that may influence workers' respiratory problems (Nikmah, 2020). Duration of work is often associated with an increased risk of occupational diseases, such as respiratory health problems caused by dusty workplaces that clog the respiratory system. The impact will be more severe if employees work longer shifts, thereby reducing their lung capacity (Meilin, 2021a). Of the 25 publications that looked at working time variables, 16 of them showed a statistically significant correlation between the number of years worked and workers' lung function. There are sixteen articles explaining why the percentage of respondents who have impaired lung function and have



worked for more than ten years is higher. Smoking is a habit that can worsen respiratory problems. Because hemoglobin carries carbon dioxide more easily than oxygen, smoking can interfere with the lungs' ability to function normally. Based on 23 articles that examined smoking habit variables, 13 articles showed that there was a relationship which explained that respondents who smoke excessively (more than 3 cigarettes/day) can cause changes in respiratory tract function. A person who consumes cigarettes at the age of more than twenty-five years has a 2 to 5 times higher risk of decreased lung function. In addition, if dust factors in the workplace are not controlled, workers' health can be further compromised due to exposure to dust which easily enters the body. A high risk figure also shows that the worker's severity level is getting worse. Of the sixteen publications that looked at PPE use, eight showed a relationship between PPE use and workers' lung function. To reduce exposure to dust entering the respiratory system, using a mask as personal protective equipment is very important ((Widiyaristi *et al.*, 2023).

The growth of the rubber processing sector is one example of how Indonesia's industrial development has increased significantly recently. PTPN Regional IV Kebun Bandar Betsy One of the sectors whose working conditions are dangerous for lung health is the rubber industry. Workers in rubber businesses are more often exposed to chemicals, smoke and dust. Dust can come from various employee activities while working, especially when transporting manufactured goods. Meanwhile, the smoke comes from burning wood during the drying process of the coagulum sheets. Meanwhile, it is exposed to corrosive substances in the air, such as ammonia, which is used in the latex manufacturing procedure. The results of the initial survey conducted showed that during the rubber processing process, workers were in an environment that was potentially exposed to dust, smoke and chemicals, which caused complaints of respiratory problems among workers. Based on the report from the PTPN Regional IV Kebun Bandar Betsy polyclinic (Polibun), it is stated that in 2023 there will be 70 cases of complaints of respiratory problems such as chest pain, shortness of breath and coughing, so is there a significant relationship from the analysis of these factors to the occurrence of respiratory symptoms in production department employee at PTPN Regional IV Kebun Bandar Betsy.

METHOD

This research is a type of quantitative research with a cross-sectional approach. This study examined the relationship between the independent variables of smoking habits, length of service, and use of personal protective equipment, on the dependent variable of complaints of respiratory problems. This research was conducted at PTPN IV Kebun Bandar Betsy from 1 December 2023 to 31 December 2023. The general population of this research was all factory employees totaling 73 employees and this research used total sampling, namely the total population of 73 employees. The analysis used in this research is univariate and bivariate analysis with the Chi-square test

RESULT

Based on the characteristics table to see the frequency distribution of respondents by gender, age, work unit as follows:

A. Frequency Distribution

Table. 1 Distribution of Respondent Characteristics among Rubber Processing Production Employees at PTPN Regional IV Kebun Bandar Betsy

Characteristics	Frequency	Percent (%)
Gender		
Man	71	97.3
Woman	2	2.7
Age		
20-40	28	38.4
41-60	45	61.6
Work unit		
Processing office	3	4.1
Latex reception	1	1.4
Analysis of sheet raw materials	1	1.4
Processing	18	24.7
Milling	21	28.8
Smoke room	10	13.7
Sorting	19	26.0
Total	73	100

The distribution of characteristics of respondents among workers in the rubber processing production sector can be seen in table 1. Based on the results of table 1 which shows 73 respondents, the highest number of respondents based on gender is that the majority of workers are men with a total of 71 respondents or around 97.3%. Meanwhile, there were only 2 female respondents or around 2.7%. The number of respondents based on age was at most 41 -60 years old, 45 respondents (61.6%) and at least 28 respondents (38.4%) aged 20-40 years. The number of respondents based on work units in the processing office section was 3 respondents (4.1%), in the latex receiving section there was 1 respondent (1.4%), in the raw material sheet analysis section there was 1 respondent (1.4%), in the processing section there were 18 respondents (24.7%), the milling section had 21 respondents (28.8%), the smoke room section had 10 respondents (13.7%), and the sorting section had 19 respondents (26.0%).

B. Univariate Analysis

Based on the following table to describe the characteristics of respondents using univariate analysis of work period, smoking habits, PPE and complaints of respiratory problems.

Table 2. Univariate Analysis of Rubber Processing Production Employees at PTPN Regional IV Kebun Bandar Betsy

Variable	Frequency	%
Years of service		
New < 5 years	19	26.0
Old > 5 years	54	74.0



Smoking Habit		
Don't have a smoking habit	31	42.5
Has a smoking habit	42	57.5
Use of Personal Protective Equipment		
Do not use	36	49.3
Use	37	50.7
Complaints of respiratory problems		
Mild Symptoms	30	56,2
Severe Symptoms	43	43.8
Total	73	100

C. Bivariat Analysis

Tabel 3. Univariate Analysis of Rubber Processing Production Employees at PTPN Regional IV Kebun Bandar Betsy.

Variable Study	Complaints of Respiratory Disorders				Total		<i>P</i> <i>Value</i>
	Mild Symptoms		Severe Symptoms		N	%	
	N	%	N	%			
Years of service							
New	12	63,2	7	36,8	19	100	0.023
Long	18	33.3	36	66.7	54	100	

Using Chi-square test analysis, bivariate analysis was then carried out to determine the relationship between the independent variable mass and the dependent variable respiratory complaints. Table 3 Statistical test analysis shows that the working time variable and the factor of complaints of respiratory symptoms in workers in the latex processing production sector are related (p-value = 0.023).

Table 5. The Relationship between Personal Protective Equipment and Complaints of Respiratory Disorders in Rubber Processing Production Workers at PTPN Regional IV Kebun Bandar Betsy

Variable Study	Complaints of Respiratory Disorders						<i>P Value</i>
					Total		
	Mild Symptoms		Severe Symptoms				
	N	%	N	%	N	%	
Use of Personal Protective Equipment							
Do not use	9	25,0	27	75,0	36	100	0.006
Use	21	56.8	16	43.2	37	100	

Using Chi-square test analysis, bivariate analysis was carried out to determine the relationship between the dependent variable, complaints of respiratory problems, and the independent variable, mass. Statistical test analysis in Table 3 shows that there is a relationship between the PPE variable (p -value = 0.006) and the factor of complaints of respiratory symptoms among employees in the latex processing production sector. Of the total 73 respondents studied, 36 respondents (49.3%) and 37 respondents (50.7%) did not use personal protective equipment (PPE). In the group that did not use PPE, as many as 75% experienced severe symptoms of respiratory problems, while 25% experienced mild symptoms. On the other hand, in the group using PPE, 43.2% experienced severe symptoms and 56.8% experienced mild symptoms.

DISCUSSION

The Relationship between Working Period and Complaints of Respiratory Disorders in Employees of the Rubber Processing Production Section at PTPN Regional IV Kebun Bandar Betsy

The work period in this research is the period of time during which an employee has worked in the rubber processing production section. Based on chi-square analysis carried out on the independent variable (length of service) on the dependent variable (complaints of respiratory problems), a p - value of $0.023 < 0.05$ was obtained, meaning that there was a relationship between length of service and complaints of respiratory problems among workers in the rubber processing production section. This significant relationship shows that as the working period increases, the likelihood of experiencing respiratory complaints also increases. The length of time a worker works around an environment that contains hazardous materials increases the risk of exposure which can have a negative impact on his health, especially respiratory problems. This means that working periods can cause lung function disorders that can occur years after the initial exposure (Afifah Zahra Eviansa *et al.*, 2022).

The findings of this study showed that as many as 36 workers who had worked for a long period of time experienced complaints of respiratory problems with severe symptoms, the percentage reached 66.7%. This is because working environmental conditions force workers to frequently be exposed to pollutants such as dust, smoke or chemicals that have the potential to damage the lungs. Based on research conducted, dust comes from work activities, while smoke comes from the smoke room work unit where wood is burned for the rubber drying process which lasts for 24 hours. In addition, chemicals are also used in the rubber production process which is another source of pollutants that are harmful to workers' respiratory health. Thus it can be concluded that the longer a person works in these environmental conditions, the greater the possibility of being exposed to dust, smoke and chemicals or dangerous substances in the workplace, which over time can cause damage to their respiratory system. According to research (Adjani and Siregar, 2023). H_0 is rejected with a value of $p = 0.001$ which is smaller than $\alpha = 0.05$. Research findings are consistent with these findings. Based on research findings, 34 employees (or 35.1%) have worked for at least five years.



The Relationship between Smoking Habits and Complaints of Respiratory Disorders in Employees of the Rubber Processing Production Section at PTPN Regional IV Kebun Bandar Betsy

The smoking habit is an action that is carried out every day (Yusup, Rochmani and Yatsi, 2021). One of the risk factors for respiratory tract disease is the smoking habit among employees (Medyati, Irjayanti and Isnaini, 2023). There is a correlation between smoking habits and complaints of respiratory problems in rubber processing production workers, with a p-value of $0.011 < 0.05$, based on chi-square analysis of the independent variable (smoking habits) and the dependent variable (complaints of respiratory problems). This strong correlation indicates that a smoker has a higher likelihood of developing respiratory problems at work. According to smoking can change the composition and function of lung tissue and respiratory tract (RAMADHANY, 2023). One cigarette contains more than 400 harmful compounds when smoked. Toxins from cigarettes accumulate in the lungs, resulting in decreased lung function (Vokasi, 2024).

The research results showed that thirty employees who smoked reported experiencing serious respiratory problems, the percentage reached 71.4%. This is because workers are heavy smokers who, on average, have started smoking since they were teenagers and are able to consume up to 1 pack of cigarettes per day. Compared with workers who are in the same workplace but do not smoke, workers who smoke and work in an environment containing pollutants are more likely to experience respiratory problems. This is because the increasing number of air pollutants entering workers' bodies in the form of cigarette smoke which contains dangerous substances, this of course has a double effect or exposure to workers who smoke. Thus, it can be concluded that the smoking habit can disrupt the respiratory system of workers, causing complaints of severe respiratory symptoms and being exacerbated by the air conditions in the workplace. Research by Pertiwi, shows that smoking habits among employees are a major risk factor for respiratory disorders (Aliya Salsabila and Yuniarti, 2022). Another study Wardana, revealed that exposure to toxins from cigarettes can cause a decrease in lung function (Muhammad Ainurrazaq, Ainin Hapis and Tinggi Ilmu Kesehatan Harapa Ibu Jambi, 2022). In addition, research by Liu th. 2018 indicates that poor air quality in the workplace can worsen the effects of smoking on the respiratory system. (Ishii *et al.*, 2022)

The Relationship between Personal Protective Equipment and Complaints of Respiratory Disorders in Employees of the Rubber Processing Production Section at PTPN Regional Iv Kebun Bandar Betsy

To protect workers from danger or the spread of disease infection, PPE personal protective equipment is a tool that functions as a barrier against the penetration of chemicals, solid particles, liquids or air (Ariqah Heru, Sahputri and Ikhsan, 2022). There is a correlation between the use of personal protective equipment (PPE) and complaints of respiratory problems, with a p-value of $0.011 < 0.05$, based on chi-square analysis carried out on the independent variable (use of PPE) and the dependent variable of complaints of respiratory problems. This strong correlation indicates that there is a lower likelihood of respiratory problems in employees who use personal protective equipment. Proper use of

PPE can reduce direct exposure to hazardous chemicals in the workplace and help reduce the risk of occupational diseases (Novita Yosephin Silalahi Jurnal Ilmu dan Teknologi Kesehatan Terpadu *et al.*, no date).

For workers, personal protective equipment includes masks, gloves, shoes, helmets and glasses. However, because it is related to the incidence of respiratory problems, research on the use of personal protective equipment focuses on the use of masks among workers in the rubber manufacturing sector. Based on the study findings, as many as 27 workers or 75.0% of the workforce who did not wear personal protective equipment at work were reported to have experienced serious respiratory problems. This shows that employees are still not aware of the need to use personal protective equipment (PPE) in the workplace, causing employees to breathe air contaminated with pollutants in the workplace and complain of respiratory problems. Several employees who did not wear personal protective equipment admitted that this made them uncomfortable because they were not used to wearing masks while working and disrupted contact with coworkers. PPE (masks) are used in an effort to reduce the number of particles that may enter the respiratory system. Using masks can reduce the possibility of respiratory problems in employees (24). By installing a barrier between workers and potential hazards, personal protective equipment (PPE) can reduce the frequency of encounters with risks even though the equipment does not completely eliminate existing hazards (Corio, Tambunan and Aminur, 2023).

Apart from that, there are also workers who wear masks but when working the masks are lowered to their chins because the workers find it difficult to breathe, which hinders their work activities (Meilin, 2021b). This, it can be concluded that workers who do not wear personal protective equipment when working have a greater chance of being exposed to pollutants in the workplace, which over time can cause damage to their respiratory system.

CONCLUSION

Based on the results of the research findings, it supports the hypothesis that there is a relationship between the independent variable and the dependent variable: length of service, smoking habits, and use of PPE on how often rubber or latex processing factory workers in Bandar Betsy Village, Bandar Huluan District report experiencing respiratory problems. The percentage of severe symptoms in elderly workers reached 51.9% during working hours, as shown by the results of statistical tests using chi square ($p\text{-value} = 0.020$), smoking habits with ($p\text{-value} = .002$) the percentage of severe symptoms in workers who habitual smoking reached 59.5%, personal protective equipment with ($p\text{-value}=.003$) the percentage of severe symptoms in workers who did not wear PPE reached 61.1%. .

RECOMMENDATION

This research emphasizes the importance of managing factors that influence the respiratory health of workers in the rubber/latex processing industry. The business world can improve the welfare of its employees by creating a safer and healthier work environment by recognizing and addressing these aspects, and reducing complaints of respiratory problems



REFERENCES

- Adjani, A.P. and Siregar, P.A. (2023) 'Faktor-Faktor yang Berhubungan dengan Keluhan Gangguan Pernapasan pada Pekerja Mebel di Kecamatan Medan Satria Kota Bekasi', *MEDIA KESEHATAN MASYARAKAT INDONESIA*, 22(1), pp. 54–59. Available at: <https://doi.org/10.14710/mkmi.22.1.54-59>.
- Afifah Zahra Eviansa, K. *et al.* (2022) *ANALISIS FAKTOR DETERMINAN TERHADAP GANGGUAN FUNGSI PARU PADA PEKERJA SPBU MAKASSAR*, *Window of Public Health Journal*.
- Aliya Salsabila and Yuniarti (2022) 'Hubungan Derajat Merokok dengan Gejala Gangguan Sistem Pernapasan pada Pegawai Universitas Islam Bandung', *Jurnal Riset Kedokteran*, 1(2), pp. 100–106. Available at: <https://doi.org/10.29313/jrk.v1i2.562>.
- Ambiya, Z.Z. (2022) 'HUBUNGAN LAMANYA PAPARAN DEBU KAYU DENGAN KELUHAN PERNAFASAN PADA PEKERJA KAYU DI BANDA ACEH', *Jurnal Kedokteran Syiah Kuala*, 22(1). Available at: <https://doi.org/10.24815/jks.v22i1.22866>.
- Ariqah Heru, U., Sahputri, J. and Ikhsan, M. (2022) 'Overview of Knowledge, Attitudes, Availability of PPE and Policies with the Use of PPE for Paramedics in North Aceh District Hospital', *Jurnal Multidisiplin Madani (MUDIMA)*, 2(4), pp. 1563–1578. Available at: <https://journal.yp3a.org/index.php/mudima/index>.
- Corio, D., Tambunan, I. and Aminur (2023) *Optimalisasi Pembangkit Listrik Tenaga Surya di Daerah Kepulauan*.
- Dinas Kesehatan Provinsi Sumatra Utara (2018) *Profil Kesehatan Sumatra Utara*. Sumatra Utara.
- Ishii, K. *et al.* (2022) 'Development of a method to determine workers' personal exposure levels to glyphosate', *Journal of Occupational Health*, 64(1). Available at: <https://doi.org/10.1002/1348-9585.12345>.
- Medyati, N., Irjayanti, A. and Isnaini, L. (2023) 'Faktor yang Berhubungan dengan Gejala Subjektif Gangguan Pernapasan pada Pekerja Industri Mebel di Distrik Abepura', *Jurnal Kesehatan Lingkungan Indonesia*, 22(2), pp. 152–159. Available at: <https://doi.org/10.14710/jkli.22.2.152-159>.
- Meilin, A. (2021a) *MANAJEMEN KESELAMATAN DAN KESEHATAN KERJA STRADA PRESS*.
- Meilin, A. (2021b) *MANAJEMEN KESELAMATAN DAN KESEHATAN KERJA STRADA PRESS*.
- Mufti Azzahri Isnaeni, L. and Masyarakat Universitas Pahlawan Tuanku Tambusai, K. (2023) 'HUBUNGAN KEBIASAAN MEROKOK DENGAN GANGGUAN PERNAPASAN PADA PENGRAJIN MEBEL KAYU', *Jurnal Pahlawan Tuanku Tambusai* [Preprint].
- Muhammad Ainurrazaq, O., Ainin Hapis, A. and Tinggi Ilmu Kesehatan Harapan Ibu Jambi, S. (2022) *PERNAFASAN PADA PEKERJA BATU BATA DI DESA TALANG BELIDO KECAMATAN SUNGAI DELAM KABUPATEN MUARO JAMBI TAHUN 2021*.

- Nikmah, F. (2020) 'LITERATURE REVIEW: RISK FACTORS WOOD DUST EXPOSURE ON WORKERS LUNG STATUS', *Jurnal Kesehatan Lingkungan*. Airlangga University Faculty of Public Health, pp. 200–210. Available at: <https://doi.org/10.20473/jkl.v12i3.2020.200-210>.
- Novita Yosephin Silalahi Jurnal Ilmu dan Teknologi Kesehatan Terpadu, S. et al. (no date) *The Practice of Using Personal Protective Equipment (PPE) and Student Work Safety in Nursing Laboratories, Tanjungpinang Health Polytechnic*.
- Nurliana (2024) 'PERILAKU MEROKOK MASYARAKAT DAN DAMPAK SOSIALNYA TERHADAP REMAJA DI KECAMATAN SUPPA KABUPATEN PINRANG', *IAIN Pare Pare* [Preprint].
- RAMADHANY, A.R. (2023) 'Analisis Konsentrasi Particulate Matter (PM_{2,5}) Udara Ambien dan Keluhan Pernapasan pada Masyarakat Di Kawasan Jl. Trunojoyo Kabupaten Jember'.
- Rukevwe, E. and Nwachukwu, A.E. (2023) *Port Harcourt Journal Of History & Diplomatic Studies Implementation of International Labour Organization (ILO) Policy on Health, Safety and Welfare of Workers in Central Senatorial District, Delta State, Port Harcourt Journal Of History & Diplomatic Studies | www.phjhs.com*. Available at: www.phjhs.com.
- Ryantri, S.J. et al. (no date) 'Determinants Of Student Smoking Behavior In Jambi City', 15, p. 2024. Available at: <https://doi.org/10.54209/eduhealth.v15i03>.
- Sekolah Tinggi Ilmu Kesehatan Kendal, L. et al. (2023) 'GAMBARAN KARAKTERISTIK DAN SATURASI OKSIGEN PADA PASIEN YANG MENGALAMI GANGGUAN PERNAPASAN', *Jurnal Gawat Darurat*, 5.
- Vlahovich, K.P. and Sood, A. (2021) 'A 2019 Update on Occupational Lung Diseases: A Narrative Review', *Pulmonary Therapy*. Adis, pp. 75–87. Available at: <https://doi.org/10.1007/s41030-020-00143-4>.
- Vokasi, F. (2024) *KARYA TULIS ILMIAH GAMBARAN KADAR TIMBAL (Pb) DALAM DARAH PADA PETUGAS PARKIR BANK BUMN DI JOMBANG IRDIANA ANATASARI 211310013 PROGRAM STUDI D-III TEKNOLOGI LABORATORIUM MEDIS*.
- Widiyaristi, D. et al. (2023) 'RISK FACTORS AFFECTING PULMONARY DISORDERS OF WORKERS IN INDONESIA: LITERATURE REVIEW 2017-2022'. Available at: <https://doi.org/10.26553/jikm.2023.14.3.263>.
- Yusup, M., Rochmani, S. and Yatsi, Stik. (2021) 'HUBUNGAN KEBIASAAN MEROKOK DENGAN KEBUGARAN JASMANI PADA REMAJA PUTRA DI SMKN 03 KABUPATEN TANGERANG TAHUN 2020 The Relationship of Smoking Habits with Physical Fitness in Adolescent Boys at State Vocational High School 3 Tangerang Regency in 2020', *Nusantara Hasana Journal*, 1(2), p. Page.