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RESEARCH ARTICLE

Relationship of Knowledge and Perception of Self-Medication of Cough Medicine to Lung Function Disorders in Construction Workers in Indonesia

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Abstract

Construction workers were at high risk for chronic lung disease and decreased lung function, which often causes coughing symptoms. Self-medicated cough medicines were not only at risk for the incidence of side effects but also associated with the economy. This study aimed to determine differences in knowledge and perceptions about pulmonary function disorders. This study was an observational study using a case-control design conducted from April to December 2018. The subject was actively working in Rungkut subdistrict, Surabaya. Data will be presented descriptively, with relationships and differences analyzed using the chi-square test. Respondents found in both groups were 158, with 79 respondents in each group. Most of the respondents had a very high level of knowledge and perception in the group with impaired lung function ($p=0.000$). In addition, there is a relationship between knowledge and perception of self-medication of cough medicine. In conclusion, knowledge is related to construction workers' perception of self-medication of cough medicine.

Keywords: Cough medicine, knowledge, lung function, perception, self-medication

Introduction

Surabaya is the second largest city in Indonesia.¹ The current focus of the Surabaya City Government is through the trade and services sector to fulfill the welfare of the residents of Surabaya city. City-scale and environmental-scale development is a priority to support development in the city of Surabaya.² The construction process produces various kinds of pollutants, such as pollution and fine dust, which will have a negative impact, especially on the health of the workers involved in the construction, namely construction workers.³

Pollutants in the workers' environment will be inhaled by the workers and enter the lungs, which will later settle in the alveoli, causing health problems such as acute respiratory infections (ARI), chronic obstructive pulmonary disease (COPD), asthma, bronchitis, and cancer.^{4,5} More than 50% of construction workers are regularly exposed to air pollution such as steam, gas, dust, or smoke.⁶ Pulmonary dysfunction causes a vast health burden worldwide. An estimated 235 million people worldwide have asthma, while more than 200 million suffer from COPD. The other 65 million have moderate to severe COPD,

8.7 million people suffer from tuberculosis (TB) each year, and more than 50 million people struggle with the disease of the lungs due to work.⁷ Globally, the incidence of COPD is predicted to increase due to several risk factors, such as the aging of the population, as well as a lack of knowledge and awareness of the disease itself.⁸

The main thing that is a risk factor for COPD is smoking. In other studies, the leading cause of COPD is 85% of smokers diagnosed cases.⁸⁻¹⁰ Cigarette smoke can cause the withdrawal of immune cells into the airways and lungs. Products exposed to cigarette smoke can cause a prolonged inflammatory response that damages the epithelium of the airways and lung tissue, reduces lung defense mechanisms, and interferes with tissue repair in the lungs.¹¹⁻¹³ As frequent smoking can cause symptoms such as dyspnea, increased sputum production, and coughing, these symptoms can be early detection of pulmonary function disorders, namely COPD.¹⁴ The symptoms that commonly occur, cough is one of the risk factors for pulmonary function disorders, namely COPD, especially in chronic cough in smokers.⁸ Coughing is the body's defense mechanism in the respiratory tract or

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is a symptom of an illness.¹⁵ Smoking is a cause of cough often experienced by subjects (41%). The cough symptom experienced by smokers was mostly a cough with phlegm (51%) with a coughing time of less than one year ago (35%).¹⁶

One way smokers can relieve cough symptoms is to use a cough medicine. Many people do self-medication or self-medication for complaints ¹⁷fever, headache, cough, and flu. At present, self-medication is one of many societies' biggest socio-health and economic problems. In some developing countries, many drugs are available to the public without a prescription, and many people are self-medicating because of the ¹¹lower costs than paying for medical services. In most developing countries, more than 60–80% of health problems are associated with self-medication.^{17,18} Many types of drugs are used to treat cough symptoms depending on the type of cough and its cause. For example, the medicine for coughs that occur due to smoking is the mucolytic type.¹⁹ Smoking can cause mucus hypersecretion because the substances in smoking cause damage to the cilia cells in the throat. Mucolytic, in this case, works by reducing the viscosity of the mucus, which is secreted excessively. It is expected to reduce the cough symptoms that occur in smokers.²⁰ Apart from mucolytics, other cough medicines that can also be used to treat coughs are the antitussive class and expectorants. Mucolytics and expectorants are cough medicines used for coughs with phlegm. In contrast, antitussives are used for coughs with phlegm (dry cough) and should not be used for coughs with phlegm because they can increase the risk of infection by bacteria or viruses. Incompatible use of drugs can have adverse effects on health.²¹

Self-medicated cough medicines are not only at risk for the incidence of side effects but are also associated with the economy. Self-medication is an attempt or selection of modern, herbal, or traditional medicine by an individual to overcome a symptom or a disease. Still, in its implementation, self-medication can be a source of medication errors due to the patient's need for knowledge about the drug and the disease. A person who feels sick will make efforts to regain his health. The options they can take to seek a cure for the disease include seeing a doctor or self-medication.^{16–18} This study aims to determine whether there are differences in knowledge and perceptions of smokers with impaired lung function and those without pulmonary function disorders. It is because pulmonary function

disorders will affect cough symptoms, which can affect knowledge and thus affect self-medication patterns,²² and perceptions of a smoker. Illness perceptions of adolescents with ⁶chronic illnesses need to be better understood. Adolescents develop and mature cognitively and socio-emotionally and become more involved in managing their condition.^{23,24}

Methods

This observational study used a case-control design to determine differences in knowledge and perceptions about cough medicine medication among construction workers. The research location used in this study is in the East Surabaya region, East Java. This research was conducted from April to December 2018, with the ethical test No. 034/KE/I/2018 at the University of Surabaya. The research variables in this study included lung function, knowledge, and perceptions about cough medicine self-medication. Pulmonary function is the ability of the lungs to enter air to remove air from the lungs. A pulmonary function test is when you breathe to find out how well a person is getting in and expelling air from the lungs. The tool used was spirometry. The results of pulmonary function (FEV₁) that were not affected were >70% and the pulmonary function affected was <0.70%.⁸ The pulmonary function of the respondents was tested using spirometry with the Contec Handheld SP10 Spirometer.

Self-medicated knowledge was the respondent's knowledge of self-medication without a doctor's prescription or professional advice.^{17,25} In this study included: (1) Knowledge of cough. Respondents' understanding of the nature/type of cough they suffer, the frequency of coughing, and the causes of coughing are related to the respondent's smoking habits. (2) Knowledge of the use of self-medicated cough medicines. Respondent's understanding of the types of cough medicines for self-medication, indications, side effects, contraindications, dosages, duration of use, and personal effects that occurred on respondents when using these self-medicated cough medicines.

The perception was the respondent's opinion or view on the following matters: (1) Perception of cough. This aspect relates to the respondent's opinion regarding the cough he is experiencing, limited activity due to the cough he is experiencing, and actions taken to overcome the cough. (2) Perceptions of the use of self-medicated

cough medicines. This aspect is related to the respondents' personal opinions regarding using self-medicated cough medicines which include the reasons for choosing a self-medicated cough medicine profile and the benefits obtained by the respondent after using the cough medicine.

The population used in this study were masons in East Surabaya. The accessible population was construction workers actively working in a housing project in the Rungkut subdistrict, East Surabaya. The sample desired to answer from this study was construction workers who meet the inclusion and exclusion criteria. Construction builder in Surabaya: male, 18–60 years, has been a builder for at least five years, smoker, and has experience using cough medicine independently. Using the Lemeshow formula, the number of samples taken in this study was because the population is unknown or infinite. Based on the results of the above calculations, the sample size set in this study was 62 respondents, so the researcher had to collect data from at least 62 respondents in this study. The sampling technique used was purposive sampling. The procedure for recruiting respondents was carried out by collecting data on all workers in the housing project in the Rungkut subdistrict. Then each worker was contacted to assess the research criteria and willingness to become a respondent.

The questionnaire on knowledge and perceptions of cough medicine self-medication was derived from previous studies.¹⁵ Data on knowledge and perceptions of drug self-medication will be presented descriptively. Test relationships and differences using the chi-square test.

Results

The knowledge questionnaire consists of 8 questions regarding knowledge of cough (no. 1–4) and self-medicated cough medicines (no. 5–8). Meanwhile, the perception questionnaire consists of 6 questions: perception of cough (no. 1–4) and perception of the use of self-medicated cough medicines (no. 5–8). All questions in the questionnaire were valid. In addition, the r-count value was greater than 0.361 (r-table value). At the same time, the reliability test results of all questions were also declared reliable because the value of Cronbach's alpha exceeds 0.6.

In this study, respondents were divided into two groups, those with impaired lung function and without lung function disorders group. Respondents found in both groups were 158, with 79 respondents in each group. Table 1 depicts that most age groups from both groups are in early adulthood, with body mass index

Table 1 Frequency Distribution of Respondent Characteristics

Respondent Characteristics	Groups				Difference Test p Value
	Without Lung Function Disorders		With Lung Function Disorders		
	n=79	%	n=79	%	
Age (years)					
Late adolescence (17–25)	20	25.32	15	18.99	0.113*
Early adulthood (26–35)	33	41.77	45	56.97	
Late adulthood (36–45)	13	16.46	15	18.99	
Early elderly (46–55)	10	12.66	3	3.80	
Late elderly (56–65)	3	3.80	1	1.27	
BMI (kg/m ²)					
Thin (<18.5)	7	8.86	6	7.59	0.485*
Normal (18.5–25.0)	59	74.68	66	83.54	
Excess body weight (25.0–27.0)	8	10.13	5	6.33	
Obesity (≥27.0)	5	6.33	2	2.53	
Th ²⁶ ing function value (%)					
Mild (FEV ₁ >80% predicted)	0	0.00	66	83.54	0.000*
Worsening (50%<FEV ₁ <80% predicted)	0	0.00	13	16.46	

Note: *p value>0.05, meaning that there was no significant difference between the two groups, so the characteristic items did not affect the research results

Table 2 Classification of Knowledge of Self-Medication of Cough Medicine

Classification of Knowledge	Groups				Difference Test p Value
	Without Lung Function Disorders		With Lung Function Disorders		
	n=79	%	n=79	%	
Very high	69	87.34	71	89.87	0.000
High	10	12.66	8	10.13	
Low	0	0.00	0	0.00	

Note: p value<0.05 significant

(BMI) being normal. Different tests with chi-square tests on the characteristics of age and BMI in the two groups aimed to determine whether these characteristics affect the study results. The different tests showed ³¹ at the p value of age and BMI<0.05 means no significant difference between the two groups, so the characteristic items did not affect the study results.

As assessed by ¹²² Brinkmann index, the severity of smoking did not differ significantly between the two groups (p=0.540), namely at the moderate level (200–600). In addition, filter cigarettes were more widely used in both groups

(p=0.600) than non-filter.

The knowledge explained to the respondents will be described following the questions in the questionnaire based on smoking, cough symptom⁵ and the use of cough medicines. Each aspect of the question answered correctly will be given a value of 1; if it is wrong, it will be given a value of 0. The results of all respondents will then be grouped into three categories: very high, high, and low. Respondents who fall into the very high category have a range of 9–12. At the same time, the knowledge value for high was 5–8, and for the low category <5.

Table 3 Profile of Respondents' Answers Regarding Perception of Self-Medication of Cough Medicine

Questions		Groups				Difference Test p Value
		Without Lung Function Disorders		With Lung Function Disorders		
		n=79	%	n=79	%	
1 Cough is a disorder in the body that can interfere with daily activities	Agree	67	84.81	61	77.22	0.000
	Disagree	23	29.11	7	8.86	
2 The smoking activity was one of the factors that most often triggered coughs	Agree	63	79.75	58	73.42	0.000
	Disagree	21	26.58	16	20.25	
3 The more often you smoke, the more frequently you cough	Agree	79	100.00	30	37.97	0.000
	Disagree	0	0.00	12	15.19	
4 The cough that smokers often experience are a cough with phlegm	Agree	75	94.94	37	46.84	0.000
	Disagree	27	34.18	19	24.05	
5 The cough experienced by a smoker would go away by itself without having to see a doctor	Agree	48	60.76	16	20.25	0.000
	Disagree	56	70.89	38	48.10	
6 Cough medicine used only relieves cough symptoms	Agree	62	78.48	14	17.72	0.023
	Disagree	55	69.62	27	34.18	

Note: p value<0.05 significant

Table 4 Classification of Perception of Self-Medication of Cough Medicine

Classification of Perception	Groups				Difference Test p Value
	Without Lung Function Disorders		With Lung Function Disorders		
	n=79	%	n=79	%	
Very high	48	60.76	46	58.23	0.000
High	28	35.44	27	34.18	
Low	3	3.80	6	7.59	

Note: p value < 0.05 significant

Table 5 Cross-Tabulation of Knowledge Results and Perceptions of Self-Medication of Cough Medicine

Classification of Knowledge	Classification of Perception				Difference Test p Value
	Very High (n=94)	High (n=55)	Low (n=9)	Total (n=158)	
Very high	89	45	6	140	0.000
High	5	10	3	18	
Low	0	0	0	0	

Note: p value < 0.05 significant

Questions no. 1 and no. 4 show that these factors do not significantly differ between the two groups, so the characteristic items did not affect the research results. However, at the classification level, the knowledge level showed a significant difference ($p=0.000$) between the two groups (Table 2).

Respondents' perceptions measured by this questionnaire were divided into three aspects, very good, good, and mediocre. In the perception question, there are a total of 6 questions related to smoking, cough medicine, and the use of cough medicine. Everyone who answers agrees it is given point 2, and those who answer disagree are given point 1, and those who answer don't know will not be assessed or 0. The results of the total points will be categorized into three categories as well as knowledge, namely very good with points (38–26), good with points (25–13), and mediocre (<13).

Table 3 shows the respondents' answers on the perception of self-medication of cough medicine, and all items indicate a difference between the two groups.

Table 4 shows that most respondents have good perceptions, both in the group with pulmonary function disorders and without lung

function disorders, which have almost the same percentage. It can be seen from the results of the highest rate of respondents, with a very good category, in the lung function disorders and without pulmonary function disorders. There was a significant difference in the different tests on the perception category of respondents with the impaired and without pulmonary function groups. It can be seen in other test using SPSS version 25, which shows $p=0.000$.

Table 5 illustrates the relationship between knowledge and perception. Most of the respondents belonged to respondents with very high levels of perception and very high levels of knowledge as well (89 of 158). However, a significant difference was seen in the different tests using SPSS version 25, which shows $p=0.000$.

Discussion

The research subjects were all male because men's and women's lung function and exercise tolerance differ. The difference is due to the different hormones and structures in men and women. Hormones that can affect lung function are the hormones estrogen and progesterone.

Estrogen and progesterone are steroid hormones. Steroid hormones are synthesized in the gonads and adrenal glands. Female lungs tend to be smaller, lighter, and contain fewer bronchioles than male lungs. The number of alveoli per unit area and alveolar volume is not different between men and women, but men have larger lungs than women. Thus, the alveoli's total number and surface area are more significant in men than in women.²⁶ In this study, using spirometry.¹⁵

There are two common types of cigarettes, kretek, and white cigarettes. Kretek cigarettes are also divided into filter and non-filter clove cigarettes. Non-filter cigarettes are more dangerous than filter cigarettes because the nicotine and tar content in non-filter cigarettes is higher. In filter cigarettes, all the combustion products from cigarettes will be inhaled and enter the respiratory tract.²⁷

The results above are under the theory which explains that non-filter cigarettes are more dangerous than filter cigarettes. Hence, the spirometry value in non-filter cigarettes is smaller because the nicotine and tar content is higher. After all, non-filter cigarettes do not use filters so that all cigarette combustion results will be completely sucked into the respiratory tract.²⁸ There are limitations in this study, namely that some respondents changed types of cigarettes several times, which could affect lung function and data results. I was controlled by asking which kind of cigarette they smoked most often. Tobacco use over a long period is associated with an increased likelihood of developing COPD, frequent productive coughing, and frequent congestion. It can affect physical activity even after controlling the smoking habit. The future use of cumulative cigarette consumption can show a consistent relationship between lung disease and non-smokers, ex-smokers, and smokers, distinguished by the number of daily cigarettes. Research conducted by Al Hariri et al.²⁹ stated that the value of lung function decreased in smokers and non-smokers. In addition, a significant correlation was found between the number of cigarettes smoked daily and the duration of smoking with decreased FVC and FEV₁ values. In this study, the severity was calculated using the Brinkman index, the multiplication of the length of smoking and the average number of cigarettes smoked per day. The severity level is categorized into 3, mild (0–200), moderate (200–600), and severe (>600).³⁰

Coughing up with excessive phlegm or not

occurring almost every day for at least three months of the year for two consecutive years. Chronic cough is associated with worsening airflow obstruction and progressive decline in lung function.³¹ Two large-scale epidemiological studies have also shown that mucus hypersecretion is significantly and consistently associated with a reduction in FEV₁ and an increased risk of COPD. The number of goblet cells and enlarged submucosa glands in response to chronic irritation of the airways by cigarette smoke or other harmful particles.³¹ Excess mucus or phlegm can be a symptom of COPD. The breathing tube can produce several ounces of mucus on a typical day. Mucus is needed to keep the respiratory tract moist. However, when the lungs become infected or irritated by irritation, more mucus is produced than average, which often causes coughing. Smoking is the most common cause of mucus production. Therefore, everyone should avoid being around smoke and limit exposure to other things that can irritate the lungs, such as pollution and smoke (paints, cleaning products, and perfumes), drugs such as bronchodilators (to open the airways), expectorants (to make mucus easier to cough up), mucolytics (to thin, thick mucus) and antibiotics (to treat infections in the lungs).^{13,31} In the different tests conducted on impaired lung function and without impaired lung function with the frequency of cough experienced, there is no significant difference, as evidenced by a p value of 1.00. It indicates no significant difference between the lung function disorders and the non-impaired lung function groups with the cough they experience.

Pharmacological therapy treatment is usually classified based on the cough type, antitussive, expectorant, and mucolytic. A cough with an antitussive or dry cough is a cough medicine whose mechanism of action is to suppress cough. Antitussives alone can cause sputum retention, which may harm patients with chronic bronchitis and bronchiectasis history.³² While cough medicine with the expectorant type is a drug that can stimulate the release of phlegm from the airways. There is no specific evidence that expectorants can stimulate expectorants. It only comes from practical experience that cough medicine with the mucolytic type is a treatment. Patients aim for mucous secretions associated with acute and chronic bronchopulmonary disorders (for example, pneumonia, bronchitis, lung disease, tracheobronchitis, chronic asthma bronchitis, tuberculosis, bronchiectasis,

Amyloidosis major lungs); atelectasis caused by a blockage of mucus. Examples of drugs that have mucolytic effects include acetylcysteine, bromhexine, and ambroxol.²¹

Frequent smoking results in dyspnea, increased sputum production and coughing. These symptoms can be detected early from lung function disruption and COPD.¹² If the symptoms that commonly occur, cough is one of the risk factors for pulmonary function disorders, namely COPD, especially in chronic coughs in smokers.⁸ Coughing can also be a pathological result of the condition. Coughing itself is also an early sign of symptoms of respiratory tract disease.¹⁴ Further examinations, such as chest x-ray, were needed to see the possibility of tuberculosis, bronchial carcinoma, or other pulmonary dysfunction. Coughing also often occurs in smokers who usually consider coughing to be a normal thing that often occurs.¹⁴ A cough that a smoker experience is known as a smoker's cough, an early sign of bronchitis, which occurs because the lungs cannot release the mucus in the bronchi. This cough occurs because the mucus catches the black powder and dust from the inhaled air and prevents them from clogging the lungs.¹⁵

Self-medication is the primary choice for the community to deal with health complaints, so the role of self-medication cannot be ignored.³³ According to WHO, self-medication is an individual's selection and use of modern medicine, herbs, and traditional medicine to treat illness or symptoms. It occurs due to the patient's lack of knowledge about drugs and their diseases.¹⁷ Likewise, perceptual learning can also shape decision-making patterns about medicines and illnesses patients suffer.

This study has several limitations, such as lung function only referring to age, weight and height, gender, smoking, and length of exposure to pollution. In addition, other factors can affect lung function, such as the classification level of smokers, the type of cigarettes used, genetics, and pollution. In addition, the types of pollution that builders get are different. Finally, there are differences in the kinds of pollution builders get based on their work division.

Conclusions

Respondents with lung function disorders have a better level of knowledge—meanwhile, respondents without lung function disorders better-perceived self-medication of cough

medicine. There was a relationship between knowledge and perception of self-medication of cough medicine in construction workers.

Conflict of Interest

Authors declare none.

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RESEARCH ARTICLE

Relationship of Knowledge and Perception of Self-Medication of Cough Medicine to Lung Function Disorders in Construction Workers in Indonesia

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Abstract

Construction workers were at high risk for chronic lung disease and decreased lung function, which often causes coughing symptoms. Self-medicated cough medicines were not only at risk for the incidence of side effects but also associated with the economy. This study aimed to determine differences in knowledge and perceptions about pulmonary function disorders. This study was an observational study using a case-control design conducted from April to December 2018. The subject was actively working in Rungkut subdistrict, Surabaya. Data will be presented descriptively, with relationships and differences analyzed using the chi-square test. Respondents found in both groups were 158, with 79 respondents in each group. Most of the respondents had a very high level of knowledge and perception in the group with impaired lung function ($p=0.000$). In addition, there is a relationship between knowledge and perception of self-medication of cough medicine. In conclusion, knowledge is related to construction workers' perception of self-medication of cough medicine.

Keywords: Cough medicine, knowledge, lung function, perception, self-medication

Introduction

Surabaya is the second largest city in Indonesia.¹ The current focus of the Surabaya City Government is through the trade and services sector to fulfill the welfare of the residents of Surabaya city. City-scale and environmental-scale development is a priority to support development in the city of Surabaya.² The construction process produces various kinds of pollutants, such as pollution and fine dust, which will have a negative impact, especially on the health of the workers involved in the construction, namely construction workers.³

Pollutants in the workers' environment will be inhaled by the workers and enter the lungs, which will later settle in the alveoli, causing health problems such as acute respiratory infections (ARI), chronic obstructive pulmonary disease (COPD), asthma, bronchitis, and cancer.^{4,5} More than 50% of construction workers are regularly exposed to air pollution such as steam, gas, dust, or smoke.⁶ Pulmonary dysfunction causes a vast health burden worldwide. An estimated 235 million people worldwide have asthma, while more than 200 million suffer from COPD. The other 65 million have moderate to severe COPD,

8.7 million people suffer from tuberculosis (TB) each year, and more than 50 million people struggle with the disease of the lungs due to work.⁷ Globally, the incidence of COPD is predicted to increase due to several risk factors, such as the aging of the population, as well as a lack of knowledge and awareness of the disease itself.⁸

The main thing that is a risk factor for COPD is smoking. In other studies, the leading cause of COPD is 85% of smokers diagnosed cases.⁸⁻¹⁰ Cigarette smoke can cause the withdrawal of immune cells into the airways and lungs. Products exposed to cigarette smoke can cause a prolonged inflammatory response that damages the epithelium of the airways and lung tissue, reduces lung defense mechanisms, and interferes with tissue repair in the lungs.¹¹⁻¹³ As frequent smoking can cause symptoms such as dyspnea, increased sputum production, and coughing, these symptoms can be early detection of pulmonary function disorders, namely COPD.¹⁴ Of the symptoms that commonly occur, cough is one of the risk factors for pulmonary function disorders, namely COPD, especially in chronic cough in smokers.⁸ Coughing is the body's defense mechanism in the respiratory tract or

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is a symptom of an illness.¹⁵ Smoking is a cause of cough often experienced by subjects (41%). The cough symptom experienced by smokers was mostly a cough with phlegm (51%) with a coughing time of less than one year ago (35%).¹⁶

One way smokers can relieve cough symptoms is to use a cough medicine. Many people do self-medication or self-medication for complaints of fever, headache, cough, and flu. At present, self-medication is one of many societies' biggest socio-health and economic problems. In some developing countries, many drugs are available to the public without a prescription, and many people are self-medicating because of their lower costs than paying for medical services. In most developing countries, more than 60–80% of health problems are associated with self-medication.^{17,18} Many types of drugs are used to treat cough symptoms depending on the type of cough and its cause. For example, the medicine for coughs that occur due to smoking is the mucolytic type.¹⁹ Smoking can cause mucus hypersecretion because the substances in smoking cause damage to the cilia cells in the throat. Mucolytic, in this case, works by reducing the viscosity of the mucus, which is secreted excessively. It is expected to reduce the cough symptoms that occur in smokers.²⁰ Apart from mucolytics, other cough medicines that can also be used to treat coughs are the antitussive class and expectorants. Mucolytics and expectorants are cough medicines used for coughs with phlegm. In contrast, antitussives are used for coughs with phlegm (dry cough) and should not be used for coughs with phlegm because they can increase the risk of infection by bacteria or viruses. Incompatible use of drugs can have adverse effects on health.²¹

Self-medicated cough medicines are not only at risk for the incidence of side effects but are also associated with the economy. Self-medication is an attempt or selection of modern, herbal, or traditional medicine by an individual to overcome a symptom or a disease. Still, in its implementation, self-medication can be a source of medication errors due to the patient's need for knowledge about the drug and the disease. A person who feels sick will make efforts to regain his health. The options they can take to seek a cure for the disease include seeing a doctor or self-medication.^{16–18} This study aims to determine whether there are differences in knowledge and perceptions of smokers with impaired lung function and those without pulmonary function disorders. It is because pulmonary function

disorders will affect cough symptoms, which can affect knowledge and thus affect self-medication patterns,²² and perceptions of a smoker. Illness perceptions of adolescents with chronic illnesses need to be better understood. Adolescents develop and mature cognitively and socio-emotionally and become more involved in managing their condition.^{23,24}

Methods

This observational study used a case-control design to determine differences in knowledge and perceptions about cough medicine medication among construction workers. The research location used in this study is in the East Surabaya region, East Java. This research was conducted from April to December 2018, with the ethical test No. 034/KE/I/2018 at the University of Surabaya. The research variables in this study included lung function, knowledge, and perceptions about cough medicine self-medication. Pulmonary function is the ability of the lungs to enter air to remove air from the lungs. A pulmonary function test is when you breathe to find out how well a person is getting in and expelling air from the lungs. The tool used was spirometry. The results of pulmonary function (FEV₁) that were not affected were >70% and the pulmonary function affected was <0.70%.⁸ The pulmonary function of the respondents was tested using spirometry with the Contec Handheld SP10 Spirometer.

Self-medicated knowledge was the respondent's knowledge of self-medication without a doctor's prescription or professional advice.^{17,25} In this study included: (1) Knowledge of cough. Respondents' understanding of the nature/type of cough they suffer, the frequency of coughing, and the causes of coughing are related to the respondent's smoking habits. (2) Knowledge of the use of self-medicated cough medicines. Respondent's understanding of the types of cough medicines for self-medication, indications, side effects, contraindications, dosages, duration of use, and personal effects that occurred on respondents when using these self-medicated cough medicines.

The perception was the respondent's opinion or view on the following matters: (1) Perception of cough. This aspect relates to the respondent's opinion regarding the cough he is experiencing, limited activity due to the cough he is experiencing, and actions taken to overcome the cough. (2) Perceptions of the use of self-medicated

cough medicines. This aspect is related to the respondents' personal opinions regarding using self-medicated cough medicines which include the reasons for choosing a self-medicated cough medicine profile and the benefits obtained by the respondent after using the cough medicine.

The population used in this study were masons in East Surabaya. The accessible population was construction workers actively working in a housing project in the Rungkut subdistrict, East Surabaya. The sample desired to answer from this study was construction workers who meet the inclusion and exclusion criteria. Construction builder in Surabaya: male, 18–60 years, has been a builder for at least five years, smoker, and has experience using cough medicine independently. Using the Lemeshow formula, the number of samples taken in this study was because the population is unknown or infinite. Based on the results of the above calculations, the sample size set in this study was 62 respondents, so the researcher had to collect data from at least 62 respondents in this study. The sampling technique used was purposive sampling. The procedure for recruiting respondents was carried out by collecting data on all workers in the housing project in the Rungkut subdistrict. Then each worker was contacted to assess the research criteria and willingness to become a respondent.

The questionnaire on knowledge and perceptions of cough medicine self-medication was derived from previous studies.¹⁵ Data on knowledge and perceptions of drug self-medication will be presented descriptively. Test relationships and differences using the chi-square test.

Results

The knowledge questionnaire consists of 8 questions regarding knowledge of cough (no. 1–4) and self-medicated cough medicines (no. 5–8). Meanwhile, the perception questionnaire consists of 6 questions: perception of cough (no. 1–4) and perception of the use of self-medicated cough medicines (no. 5–8). All questions in the questionnaire were valid. In addition, the r-count value was greater than 0.361 (r-table value). At the same time, the reliability test results of all questions were also declared reliable because the value of Cronbach's alpha exceeds 0.6.

In this study, respondents were divided into two groups, those with impaired lung function and without lung function disorders group. Respondents found in both groups were 158, with 79 respondents in each group. Table 1 depicts that most age groups from both groups are in early adulthood, with body mass index

Table 1 Frequency Distribution of Respondent Characteristics

Respondent Characteristics	Groups				Difference Test
	Without Lung Function Disorders		With Lung Function Disorders		
	n=79	%	n=79	%	p Value
Age (years)					
Late adolescence (17–25)	20	25.32	15	18.99	0.113*
Early adulthood (26–35)	33	41.77	45	56.97	
Late adulthood (36–45)	13	16.46	15	18.99	
Early elderly (46–55)	10	12.66	3	3.80	
Late elderly (56–65)	3	3.80	1	1.27	
BMI (kg/m ²)					
Thin (<18.5)	7	8.86	6	7.59	0.485*
Normal (18.5–25.0)	59	74.68	66	83.54	
Excess body weight (25.0–27.0)	8	10.13	5	6.33	
Obesity (≥27.0)	5	6.33	2	2.53	
The lung function value (%)					
Mild (FEV ₁ >80% predicted)	0	0.00	66	83.54	
Worsening (50%<FEV ₁ <80% predicted)	0	0.00	13	16.46	

Note: *p value>0.05, meaning that there was no significant difference between the two groups, so the characteristic items did not affect the research results

Table 2 Classification of Knowledge of Self-Medication of Cough Medicine

Classification of Knowledge	Groups				Difference Test
	Without Lung Function Disorders		With Lung Function Disorders		
	n=79	%	n=79	%	p Value
Very high	69	87.34	71	89.87	0.000
High	10	12.66	8	10.13	
Low	0	0.00	0	0.00	

Note: p value < 0.05 significant

(BMI) being normal. Different tests with chi-square tests on the characteristics of age and BMI in the two groups aimed to determine whether these characteristics affect the study results. The different tests showed that the p value of age and BMI < 0.05 means no significant difference between the two groups, so the characteristic items did not affect the study results.

As assessed by the Brinkmann index, the severity of smoking did not differ significantly between the two groups (p=0.540), namely at the moderate level (200–600). In addition, filter cigarettes were more widely used in both groups

(p=0.600) than non-filter.

The knowledge explained to the respondents will be described following the questions in the questionnaire based on smoking, cough symptoms, and the use of cough medicines. Each aspect of the question answered correctly will be given a value of 1; if it is wrong, it will be given a value of 0. The results of all respondents will then be grouped into three categories: very high, high, and low. Respondents who fall into the very high category have a range of 9–12. At the same time, the knowledge value for high was 5–8, and for the low category < 5.

Table 3 Profile of Respondents' Answers Regarding Perception of Self-Medication of Cough Medicine

Questions		Groups				Difference Test
		Without Lung Function Disorders		With Lung Function Disorders		
		n=79	%	n=79	%	p Value
1 Cough is a disorder in the body that can interfere with daily activities	Agree	67	84.81	61	77.22	0.000
	Disagree	23	29.11	7	8.86	
2 The smoking activity was one of the factors that most often triggered coughs	Agree	63	79.75	58	73.42	0.000
	Disagree	21	26.58	16	20.25	
3 The more often you smoke, the more frequently you cough	Agree	79	100.00	30	37.97	0.000
	Disagree	0	0.00	12	15.19	
4 The cough that smokers often experience are a cough with phlegm	Agree	75	94.94	37	46.84	0.000
	Disagree	27	34.18	19	24.05	
5 The cough experienced by a smoker would go away by itself without having to see a doctor	Agree	48	60.76	16	20.25	0.000
	Disagree	56	70.89	38	48.10	
6 Cough medicine used only relieves cough symptoms	Agree	62	78.48	14	17.72	0.023
	Disagree	55	69.62	27	34.18	

Note: p value < 0.05 significant

Table 4 Classification of Perception of Self-Medication of Cough Medicine

Classification of Perception	Groups				Difference Test
	Without Lung Function Disorders		With Lung Function Disorders		
	n=79	%	n=79	%	p Value
Very high	48	60.76	46	58.23	0.000
High	28	35.44	27	34.18	
Low	3	3.80	6	7.59	

Note: p value<0.05 significant

Table 5 Cross-Tabulation of Knowledge Results and Perceptions of Self-Medication of Cough Medicine

Classification of Knowledge	Classification of Perception				Difference Test
	Very High (n=94)	High (n=55)	Low (n=9)	Total (n=158)	
Very high	89	45	6	140	0.000
High	5	10	3	18	
Low	0	0	0	0	

Note: p value<0.05 significant

Questions no. 1 and no. 4 show that these factors do not significantly differ between the two groups, so the characteristic items did not affect the research results. However, at the classification level, the knowledge level showed a significant difference ($p=0.000$) between the two groups (Table 2).

Respondents' perceptions measured by this questionnaire were divided into three aspects, very good, good, and mediocre. In the perception question, there are a total of 6 questions related to smoking, cough medicine, and the use of cough medicine. Everyone who answers agrees it is given point 2, and those who answer disagree are given point 1, and those who answer don't know will not be assessed or 0. The results of the total points will be categorized into three categories as well as knowledge, namely very good with points (38–26), good with points (25–13), and mediocre (<13).

Table 3 shows the respondents' answers on the perception of self-medication of cough medicine, and all items indicate a difference between the two groups.

Table 4 shows that most respondents have good perceptions, both in the group with pulmonary function disorders and without lung

function disorders, which have almost the same percentage. It can be seen from the results of the highest rate of respondents, with a very good category. in the lung function disorders and without pulmonary function disorders. There was a significant difference in the different tests on the perception category of respondents with the impaired and without pulmonary function groups. It can be seen in the other test using SPSS version 25, which shows $p=0.000$.

Table 5 illustrates the relationship between knowledge and perception. Most of the respondents belonged to respondents with very high levels of perception and very high levels of knowledge as well (89 of 158). However, a significant difference was seen in the different tests using SPSS version 25, which shows $p=0.000$.

Discussion

The research subjects were all male because men's and women's lung function and exercise tolerance differ. The difference is due to the different hormones and structures in men and women. Hormones that can affect lung function are the hormones estrogen and progesterone.

Estrogen and progesterone are steroid hormones. Steroid hormones are synthesized in the gonads and adrenal glands. Female lungs tend to be smaller, lighter, and contain fewer bronchioles than male lungs. The number of alveoli per unit area and alveolar volume is not different between men and women, but men have larger lungs than women. Thus, the alveoli's total number and surface area are more significant in men than in women.²⁶ In this study, using spirometry.¹⁵

There are two common types of cigarettes, kretek, and white cigarettes. Kretek cigarettes are also divided into filter and non-filter clove cigarettes. Non-filter cigarettes are more dangerous than filter cigarettes because the nicotine and tar content in non-filter cigarettes is higher. In filter cigarettes, all the combustion products from cigarettes will be inhaled and enter the respiratory tract.²⁷

The results above are under the theory which explains that non-filter cigarettes are more dangerous than filter cigarettes. Hence, the spirometry value in non-filter cigarettes is smaller because the nicotine and tar content is higher. After all, non-filter cigarettes do not use filters so that all cigarette combustion results will be completely sucked into the respiratory tract.²⁸ There are limitations in this study, namely that some respondents changed types of cigarettes several times, which could affect lung function and data results. I was controlled by asking which kind of cigarette they smoked most often. Tobacco use over a long period is associated with an increased likelihood of developing COPD, frequent productive coughing, and frequent congestion. It can affect physical activity even after controlling the smoking habit. The future use of cumulative cigarette consumption can show a consistent relationship between lung disease and non-smokers, ex-smokers, and smokers, distinguished by the number of daily cigarettes. Research conducted by Al Hariri et al.²⁹ stated that the value of lung function decreased in smokers and non-smokers. In addition, a significant correlation was found between the number of cigarettes smoked daily and the duration of smoking with decreased FVC and FEV₁ values. In this study, the severity was calculated using the Brinkman index, the multiplication of the length of smoking and the average number of cigarettes smoked per day. The severity level is categorized into 3, mild (0–200), moderate (200–600), and severe (>600).³⁰

Coughing up with excessive phlegm or not

occurring almost every day for at least three months of the year for two consecutive years. Chronic cough is associated with worsening airflow obstruction and progressive decline in lung function.³¹ Two large-scale epidemiological studies have also shown that mucus hypersecretion is significantly and consistently associated with a reduction in excess FEV₁ and an increased risk of COPD. The number of goblet cells and enlarged submucosa glands in response to chronic irritation of the airways by cigarette smoke or other harmful particles.³¹ Excess mucus or phlegm can be a symptom of COPD. The breathing tube can produce several ounces of mucus on a typical day. Mucus is needed to keep the respiratory tract moist. However, when the lungs become infected or irritated by irritation, more mucus is produced than average, which often causes coughing. Smoking is the most common cause of mucus production. Therefore, everyone should avoid being around smoke and limit exposure to other things that can irritate the lungs, such as pollution and smoke (paints, cleaning products, and perfumes), drugs such as bronchodilators (to open the airways), expectorants (to make mucus easier to cough up), mucolytics (to thin, thick mucus) and antibiotics (to treat infections in the lungs).^{13,31} In the different tests conducted on impaired lung function and without impaired lung function with the frequency of cough experienced, there is no significant difference, as evidenced by a p value of 1.00. It indicates no significant difference between the lung function disorders and the non-impaired lung function groups with the cough they experience.

Pharmacological therapy treatment is usually classified based on the cough type, antitussive, expectorant, and mucolytic. A cough with an antitussive or dry cough is a cough medicine whose mechanism of action is to suppress cough. Antitussives alone can cause sputum retention, which may harm patients with chronic bronchitis and bronchiectasis history.³² While cough medicine with the expectorant type is a drug that can stimulate the release of phlegm from the airways. There is no specific evidence that expectorants can stimulate expectorants. It only comes from practical experience that cough medicine with the mucolytic type is a treatment. Patients aim for mucous secretions associated with acute and chronic bronchopulmonary disorders (for example, pneumonia, bronchitis, lung disease, tracheobronchitis, chronic asthma bronchitis, tuberculosis, bronchiectasis,

Amyloidosis major lungs); atelectasis caused by a blockage of mucus. Examples of drugs that have mucolytic effects include acetylcysteine, bromhexine, and ambroxol.²¹

Frequent smoking results in dyspnea, increased sputum production and coughing. These symptoms can be detected early from lung function disruption and COPD. Of the symptoms that commonly occur, cough is one of the risk factors for pulmonary function disorders, namely COPD, especially in chronic coughs in smokers.⁸ Coughing can also be a pathological result of the condition. Coughing itself is also an early sign of symptoms of respiratory tract disease.¹⁴ Further examinations, such as chest x-ray, were needed to see the possibility of tuberculosis, bronchial carcinoma, or other pulmonary dysfunction. Coughing also often occurs in smokers who usually consider coughing to be a normal thing that often occurs.¹⁴ A cough that a smoker experience is known as a smoker's cough, an early sign of bronchitis, which occurs because the lungs cannot release the mucus in the bronchi. This cough occurs because the mucus catches the black powder and dust from the inhaled air and prevents them from clogging the lungs.¹⁵

Self-medication is the primary choice for the community to deal with health complaints, so the role of self-medication cannot be ignored.³³ According to WHO, self-medication is an individual's selection and use of modern medicine, herbs, and traditional medicine to treat illness or symptoms. It occurs due to the patient's lack of knowledge about drugs and their diseases.¹⁷ Likewise, perceptual learning can also shape decision-making patterns about medicines and illnesses patients suffer.

This study has several limitations, such as lung function only referring to age, weight and height, gender, smoking, and length of exposure to pollution. In addition, other factors can affect lung function, such as the classification level of smokers, the type of cigarettes used, genetics, and pollution. In addition, the types of pollution that builders get are different. Finally, there are differences in the kinds of pollution builders get based on their work division.

Conclusions

Respondents with lung function disorders have a better level of knowledge—meanwhile, respondents without lung function disorders better-perceived self-medication of cough

medicine. There was a relationship between knowledge and perception of self-medication of cough medicine in construction workers.

Conflict of Interest

Authors declare none.

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