Main Factors Of Lung Cancer in Abdul Muluk Regional Public Hospital Of Lampung Province

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Abstract

Lung cancer is a disease of uncontrolled tissue growth in lung tissue. The largest cause of death in the world, reaching 1.61 million deaths per year (12.7%). According to data from the RSUDAM in 2019, 697 patients were diagnosed with tumors caused by various factors. The aim of researching the factors associated with lung cancer in Abdul Muluk Regional Public Hospital in 2020. This quantitative study was a case-control design, with a cancer population of 168 people and 285 patients with other diseases, the ratio of cases: Control = 1:2, the total sample size was 43 cancer respondents and 86 non-lung cancer respondents according to data with the observation sheet. Distribution of cancer frequency by 43 (33.3%) respondents, occupational risk as many as 33 (25.6%) respondents, smoking as much as 82 (63.6%) respondents, family history with descent as many as 34 (26.4%) respondents, 69 (53.5%) history of TB disease, there is a relationship with the type of work (p-value: 0.000 and OR = 17.261), smoking (p-value: 0.000 and OR = 9.750), family history (p-value: 0.001 and OR = 4.472) and history of TB (p-value: 0.039 and OR = 2.382) with lung cancer at Dr. H. Abdul Moeloek, Lampung Province in 2020. There is a relationship between occupation, smoking, family history and history of TB with lung cancer at Dr. H. Abdul Moeloek, Lampung Province in 2020, it is recommended that the Lung Doctor make a joint service program through various activities such as conducting training for health workers in preventing lung cancer such as: counseling on the dangers of smoking.

Keywords
lung cancer, occupation, smoking, TB disease, heredity

1. Introduction

As cancer generally, lung cancer is the same where the exact cause of the cancer is unknown but there are several factors that are thought to be risk factors for lung cancer. These factors include inhaling carcinogens such as cigarettes, air pollution, and certain industrial substances such as asbestos and arsenic. Most of the inhaled carcinogens in lung cancer are caused by smoking and cigarette contains "tar", an aromatic polysilicon hydrocarbon.

Lung cancer is a disease of uncontrolled growth of lung tissue. Cancer is characterized by abnormal cell growth, unlimited growth, and damage to normal tissue cells. Lung cancer is the world's largest killer, with 1.61 million deaths per year (12.7%), breast cancer with 1.31 million deaths per year (10.9%), and rectal cancer - 1.23 million deaths per year (9.7%) (Varalakshmi, 2013: 63). In Indonesia, lung cancer is the third most common cancer found in several hospitals (Metha Arsilita Hulma, et al, 2014).

The main cause of lung cancer is the smoke from burning the cigarette which is known to cause cancer with 63 types of carcinogens and toxic substances (Indonesian Lung Doctors Association). According to the American Cancer Society (2019), 80% of lung cancer cases are caused by smoking (active smoking) and 20% (second-hand smoke). Other causes of lung cancer are radiation and air pollution. In addition, nutrition and genetics have been shown to play a role in the occurrence of lung cancer (Albert & Samet, 2017).

Lung cancer is the leading cause of death in industrialized countries. One-third of deaths of male in the United States and one of the leading causes of death in women are caused by lung cancer. In 2011, there were about 221,000 new cases of lung cancer and 156,900 deaths, according to the American Cancer Society. Lung cancer in women is on the rise, with more women dying from lung cancer since 1987 than from breast cancer. This shows a causal relationship between smoking and lung cancer. Most often, lung cancer occurs in patients aged 50 to 60 years (Kumar et al., 2013).
Pallis and Syrigos (2013) reported that, in Greece, people with a family history of cancer had a 2.01 times higher risk of developing lung cancer than those without a family history of cancer. This difference was influenced by the majority of cases and controls in this study who did not have a family history of cancer.

A study by Behera and Balamugesh (2005) in India found that the risk of lung cancer from exposure to biomass smoke was 5.33 times higher. Biomass smoke exposure is the most serious lung cancer risk in India. Biomass is widely used as a fuel in developing countries. Particles and gases from biomass fuels can cause changes in the lung parenchyma. A prospective study by Gunbatar et al. (2012) in Turkey confirmed that exposure to biomass fuel vapors is toxic to lung tissue and it causes cancer.

Cancer is characterized by abnormal cell growth, unlimited cell growth, and damage to normal tissue cells. Lung cancer is the biggest killer in the world, with 1.61 million deaths per year (12.7%), breast cancer with 1.31 million deaths per year (10.9%), and rectal cancer 1.23 million deaths per year (9.7%). According to Abdul Muluk Regional Public Hospital of Lampung Province, in 2019 there were 697 patients diagnosed with tumors. 325 patients were detected as malignant tumors (cancer), with details of 168 lung cancer patients, 103 breast cancer patients, the rest were other cancers and 372 other were benign tumors. The remaining 73 were known to only be infected with lymph gland tumors. Lymphoid was also common in a total of 320 cases. In detail, 96 cases were cancer (malignant), 207 were benign and 17 were infected. Meanwhile, there were 309 cases of soft tissue tumors, with 98 cases found. Other types of tumor disease that are often found are ovarian (92 cases), neck tumor (229 cases), antrum tumor (55 cases), lung tumor (64 cases), prostate (63 cases), and cervix (80 cases).

Based on the previous studies above, this study is aimed to determine the factors associated with lung cancer at Abdul Muluk Regional Public Hospital of Lampung Province in the year of 2020.

2. Methodology
This study used a quantitative case-control study method to identify factors associated with lung cancer. The population of this study were all patients that were treated in the pulmonary unit at Abdul Muluk Regional Public Hospital of Lampung Province. From the medical record, there were 453 cases in 2019. This study was carried out afterwards, conducted in June 2020. The data were collected using observation sheets. The Data were analyzed using one dimension and two dimensions (chi-square).

3. Result and Discussion
3.1. Result
Univariate Analysis
From the data collected, the results are shown as follows:

Table 1. Frequency distribution of factors associated with lung cancer at Abdul Muluk Regional Public Hospital of Lampung Province in the year of 2020

<table>
<thead>
<tr>
<th>Variables</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung cancer</td>
<td>Yes</td>
<td>43</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>86</td>
<td>66.7</td>
</tr>
<tr>
<td>Occupation</td>
<td>Risky</td>
<td>33</td>
<td>25.6</td>
</tr>
<tr>
<td></td>
<td>No Risk</td>
<td>96</td>
<td>74.4</td>
</tr>
<tr>
<td>Smoking</td>
<td>Yes</td>
<td>82</td>
<td>63.6</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>47</td>
<td>36.4</td>
</tr>
<tr>
<td>Family History</td>
<td>Inheritance</td>
<td>34</td>
<td>26.4</td>
</tr>
<tr>
<td></td>
<td>No inheritance</td>
<td>95</td>
<td>73.6</td>
</tr>
<tr>
<td>History of Tuberculosis</td>
<td>Exist</td>
<td>69</td>
<td>53.5</td>
</tr>
</tbody>
</table>
From Table 1 it is known that from 129 respondents, mostly did not suffer from lung cancer, 86 (66.7%) were respondents, most of them with risky jobs which were 96 (59.9%) of respondents, most of whom smoke as much as 82 (63.6%) of respondents, and 95 (73.6%) of the respondents had no family history and 69 (53.5%) of them had Tuberculosis.

**Bivariate Analysis**

The results of the statistical analysis are shown as follows:

**Table 2. Relationship Between Occupation and Lung Cancer**

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Lung Cancer</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>p-value</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risky</td>
<td>Yes</td>
<td>26</td>
<td>60.5</td>
<td>7</td>
<td>8.1</td>
<td>33</td>
<td>25.6</td>
<td>0.000</td>
<td>17.261</td>
<td>(6.443-46.241)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>17</td>
<td>39.5</td>
<td>79</td>
<td>91.9</td>
<td>96</td>
<td>74.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>43</td>
<td>100.0</td>
<td>86</td>
<td>100.0</td>
<td>129</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From Table 2, the results show that of 43 respondents with lung cancer, 26 (60.5%) of the respondents had a risky job, and 17 (39.5%) of the respondents did not have a risky job. Out of the 86 respondents without lung cancer, 7 (8.1%) respondents had a risky type of work, and 79 (91.9%) respondents did not have a risky type of work.

Based on the results of statistical tests, it was found that the value of $p = 0.000$, which means $p < \alpha$ (0.05), it can be concluded that there is a relationship between the type of work and lung cancer at Abdul Muluk Regional Public Hospital of Lampung Province with an OR of 17.261 which means that respondents with a risky occupation are 17 times more likely to suffer from lung cancer than respondents who do not have risky jobs.

**Table 3. Relationship Between Smoking and Lung Cancer**

<table>
<thead>
<tr>
<th>Smoking History</th>
<th>Lung Cancer</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>p-value</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>39</td>
<td>90.7</td>
<td>43</td>
<td>50.0</td>
<td>82</td>
<td>63.6</td>
<td>0.000</td>
<td>9.750</td>
<td>(3.205-29.657)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>4</td>
<td>9.3</td>
<td>43</td>
<td>50.0</td>
<td>47</td>
<td>36.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>43</td>
<td>100.0</td>
<td>86</td>
<td>100.0</td>
<td>129</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From Table 3, the results show that from 43 respondents with lung cancer, 39 (90.7%) respondents smoked and 4 (9.3%) did not smoke. From 86 respondents who did not suffer from lung cancer, 43 (50.0%) smoked and 43 (50.0%) did not.

Based on the results of statistical tests, it was obtained that the value of $p = 0.000$, which means $p < \alpha$ (0.05). It can be concluded that there is a relationship between smoking and lung cancer in Abdul Muluk Regional Public Hospital of Lampung Province in 2020, with an OR of 9.750 meaning that smokers are 9 times more likely to develop lung cancer than non-smokers.

**Table 4. Relationship Between Family’s Cancer Inheritance and Lung Cancer**

<table>
<thead>
<tr>
<th>Family History</th>
<th>Lung Cancer</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>p-value</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inherited</td>
<td>Yes</td>
<td>20</td>
<td>46.5</td>
<td>14</td>
<td>16.3</td>
<td>34</td>
<td>26.4</td>
<td>0.001</td>
<td>4.472</td>
<td>(1.952-10.243)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>23</td>
<td>53.5</td>
<td>72</td>
<td>83.7</td>
<td>95</td>
<td>73.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>43</td>
<td>100.0</td>
<td>86</td>
<td>100.0</td>
<td>129</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
From table 4, the results show that of the 43 respondents with lung cancer, 20 (46.5%) of the respondents had children, and 23 (53.5%) of the respondents had no children. From the 86 without lung cancer, 14 (16.3%) had children, and 72 (83.7%) had no children.

The statistical test result p-value = 0.001, which means p < α (0.05). From the result, it can be concluded that there is a relationship between family history and lung cancer in Abdul Muluk Regional Public Hospital. It was also found that with an OR of 4.472 means that respondents without a family history cancer inheritance are 4 times more likely to develop lung cancer than respondents with a family history of descent.

From Table 5, the survey results show that of the 43 respondents with lung cancer, 29 (67.4%) respondents had a history of TB disease, and 14 (32.6%) respondents did not suffer from TB. Of the 86 respondents who did not suffer from lung cancer, 40 (46.5%) respondents had hereditary factors, and 46 (53.5%) respondents did not suffer from TB.

The statistical test results p-value = 0.039, which means p < α (0.05), it can be concluded that there is a relationship between history of lung disease and lung cancer in Abdul Muluk Regional Public Hospital with an OR of 2.382 means that respondents with TB were twice as likely to develop lung cancer as those who did not have TB.

3.2. Discussion

Based on the results of statistical tests, it was found that the value of p = 0.000, which means p < α (0.05). It can be assumed that there is a relationship between the type of work and lung cancer at Abdul Muluk Regional Public Hospital of Lampung Province with an OR of 17,261 in 2020 means that respondents with a risky occupation are 17 times more likely to develop lung cancer than respondents who work without a risk.

Based on the results of the statistical test, it was found that the value of p = 0.000, which means p < α (0.05). It can be said that there is a relationship between the type of work and lung cancer at Abdul Muluk Regional Public Hospital of Lampung Province with an OR of 17,261 in 2020 means that respondents with a risky job are 17 times more likely to develop lung cancer than respondents who work without a risk.

Lung cancer can be caused by occupation. Based on the results of statistical tests, the value of p = 0.000, which means p < α (0.05). It can be concluded that there is a relationship between the type of work and lung cancer at Abdul Muluk Regional Public Hospital of Lampung Province with an OR of 17,261 in 2020 means that respondents with a risky job are 17 times more likely to develop lung cancer than respondents who work without that risk.

According to Wahyuningsih (2003) one example of occupational lung disease is caused by paint spray. Spray paint converts a substance into an aerosol, which is a collection of small particles in the form of a liquid or solid, so that due to its small size it is easily inhaled which has the potential to have an impact on lung health. Pigments in paint are useful for coloring and increasing paint resistance. Many types of pigments are dangerous, namely chromium and cadmium. Applying green, yellow and orange colors can cause lung cancer and irritation of the skin, nose and upper respiratory tract.

In her study entitled Risk Factors for Lung Cancer in Women Undergoing Treatment conducted at the Lung Section of Dr. M. Jamil Padang and RSUD Solok, Ernawati (2019) used a case control study design with 23 women with lung cancer as cases and 46 women without lung cancer as controls. The study was performed at the Lung Section of Dr. M. Jamil Padang and RSUD Solok during 2018. The sampling was carried out without probability using a sequential method.

There was no significant difference in characteristics between the observation and control groups. There is a significant relationship between exposure to cigarette smoke from parents with lung cancer in women (OR = 13.46, 95% CI 95% 4.04-44.82; p = 0.0001). There was no significant difference in smoking (OR = 2.05 95% CI 1.23-3.46; p = 1000), the husband's cigarette smoke exposure (OR = 2.97 95% CI 1.03-8.60; p = 0.074), exposure to cigarette smoke from parents with lung cancer in women (OR = 17.261 95% CI 4.04-44.82; p = 0.0001).
that exposure to secondhand smoke is the main risk factor for lung cancer in women with lung cancer at Dr. Wahidin Sudirohusodo Makassar.

Based on the results of the study, it is known that of the 43 respondents with lung cancer, 17 (39.5%) respondents did not have a risky type of work. This is due to many things besides the type of work that causes lung cancer, including passive smoking, such as the length of exposure to cigarette smoke from smoking parents. Carcinogens in cigarette smoke can stimulate changes and mutations in cells. Even if the child does not smoke, chronic irritation by carcinogens from cigarette smoke from parents can cause cell changes that can lead to cancer cell formation. According to researchers, there are many types of work. There are jobs that produce goods and there are jobs that provide services. The work of producing goods shows in the results. The job of providing services can only be experienced through service benefits. Exposure to arsenic, nickel, chromium, aromatics, and ether in some occupations can increase the risk of lung cancer.

Based on the research results, it was found that cigarettes. Based on the results of the statistical test p-value = 0.000, which means p <α (0.05), it can be concluded that there is a relationship between the type of work and lung cancer at Abdul Muluk Regional Public Hospital with OR 17.261, where the work variable is the most dominant variable, including the type of risky work and length of work associated with decreased lung function which can cause lung function disorders. The longer a person works in a dusty environment, the higher the risk of dust entering the work environment which can affect health, especially respiratory problems. And if dust is continuously inhaled and alveolar deposits can lead to alveolar fibrosis. When the alveoli harden, it will reduce the elasticity of the air volume that surrounds them, so that the ability to hold oxygen is reduced, so that lung function is reduced.

The condition of the lungs can be determined by the nature of a person's job. "The lungs are complex organs. Human work and the environment can lead to the development of pulmonary fibrosis (traumatic scarring that impairs lung function), asthma, chronic obstructive pulmonary disease (COPD or COPD), infections, and cancer (Herber, 2019). An unhealthy environment is certainly unhealthy, but work rhythm is also associated with disease risk.

Based on the results of the study, it is known that of the 43 respondents with lung cancer, 26 (60.5%) of respondents have a risky type of work, this is in line with the theory that the strongest relationship is observed in the related profession. For ceramics, faience, industrial and brick production. Non-ferrous metal. In addition, in a small number of people, a higher risk of lung cancer was found in people who worked in gas stations, glass stations, and welding. This can be caused by continuous exposure to certain chemicals without the use of suitable personal protective equipment, such as special masks that can filter out small particles, or a lack of medical examinations by workers themselves. These results highlight the need for continuous monitoring and improved control of occupational exposure to certain chemicals. This is prevention and compensation for workers. Exposure to chemicals and substances such as formaldehyde and asbestos, silicon dioxide, chromium, is an important risk factor for lung cancer, especially when combined with smoking. A person may be exposed to these chemicals at home, but exposure to these chemicals and substances in the workplace is considered a serious cause of lung cancer. Some of the industrial chemicals linked to lung cancer include asbestos, arsenic, chromium compounds, nickel compounds, PAHs (polycyclic aromatic hydrocarbons), vinyl chloride, wood dust, crystalline silica (silica dust).

Lung cancer is considered to be the most common occupational cancer. The exact percentage of lung cancer patients exposed to occupational carcinogens that contribute to disease progression is difficult to estimate because of the varying intensity of exposure, different genetic / ethnic origins, and smoking history. However, some authors cite a figure of around 10%. Exposure to agents associated with the development of lung cancer is very important because: Lung cancer is considered the most common occupational cancer. The exact percentage of lung cancer patients exposed to occupational carcinogens that contribute to disease progression is difficult to estimate because of the varying intensity of exposure, different genetic / ethnic origins, and smoking history. However, some authors cite a figure of around 10%. Exposure to agents associated with the development of lung cancer is very important because based on the results of the study it is also known that 17 (39.5%) of the respondents did not do risky work, this was due to other factors, namely the respondent was attacked by lung cancer, such as the presence of tuberculosis. , smoking addiction, which provokes lung cancer.

According to the researchers, of the 86 respondents who did not suffer from lung cancer, 7 (8.1%) of the respondents did risky activities, the respondents did not have lung disease. It is possible that during work the respondents used complete personal protective equipment to avoid disease as an effort to prevent lung cancer. Support efforts to prevent dust exposure on street sweeping officers by facilitating PPE in the form of masks that comply with standards. Providing health may be done with rewards (in the form of praise to reward) and punishment (maybe in the form of a warning on a warning letter) for mask users while working, wet sweeping in some areas. There should be regular health checks, especially those concerning lung health, by street reporters. Time management has to do with rotating workers in high-traffic, high-dust work areas to work areas with low enough traffic and dust for workers every 10 years.
The Relationship Between Smoking History and Lung Cancer

Based on the results of statistical tests, it was obtained that the value of $p = 0.000$, which means $p < \alpha$ (0.05), it can be concluded that there is a relationship between smoking and lung cancer in Abdul Muluk Regional Public Hospital with an OR of 9.750, meaning that smokers are 9 times more likely to develop lung cancer than non-smokers. Smoking is thought to be the main cause of lung cancer (Riskesdas, 2013). However, not everyone who gets lung cancer is a smoker. Many people with lung cancer are former smokers, but some have never smoked at all.

Lung cancer can be caused by air pollution, exposure to carcinogenic substances in the workplace such as asbestos, chromium, polycyclic hydrocarbons and radon gas which are found naturally in rocks, groundwater and soil (Purba, 2015) and passive smoking. Passive smokers are people who inhale secondhand smoke from other people. The risk of lung cancer can occur in children who are exposed to secondhand smoke for 25 years (Ernawati, 2019). Women who live with a smoker's partner are also at 2-3 times the risk of lung cancer (Rahmawan, 2010).

The exact cause of lung cancer is unknown, but exposure to carcinogens is a major contributing factor. Lung cancer is closely related to smoking. Cigarette smoke that has been identified can cause cancer with 63 types of being carcinogenic and toxic (Indonesian Lung Doctors Association, 2015). According to the American Cancer Society (2013), 80% of lung cancer cases are caused by smoking (active smokers), where second-hand smoke is 20% to 30% at risk of developing lung cancer. Apart from the main factors causing lung cancer, there are other factors such as air pollution, radon exposure, genetics and the environment (Urman & Hosgood, 2015).

Tobacco is processed from the leaves of the genus Nicotiana. Apart from being used as medicine, tobacco plants are also used in biotechnology and as an ornamental plant. Nicotiana tabacum and rustica are considered the main commercial species, with nicotine alkaloids being tobacco addicts responsible for their tolerance and dependence; however, it is not a carotenogen. After harvesting, the tobacco is preserved for several days, allowing for the slow oxidation and degradation of the constituent carotenoids. This allows a 'smoothness' of the smoke, giving the cured tobacco an aromatic taste. After drying, the tobacco is transferred to a storage area for processing. For whole plants, the leaves are removed from the tobacco stem in a process called stripping, which makes the smoke softer and more breathable. Tobacco is then packaged in various forms for consumption (eg smoking, chewing, smoked, etc.) Preserved tobacco which is easily inhaled and causes lung cancer and other disease processes (Furrkhu, 2013).

Smokers are prone to side effects that often occur during chemotherapy and radiotherapy programs (ie mucositis), and when under general anesthesia (GA), and surgical complications. Their postoperative survival was also worse. The overall 10-year survival rate and certain diseases fell as the number of packs of cigarettes smoked increased in patients with surgical resection. Smoking was also associated with a poorer quality of life and resulted in patients developing secondary cancer and chronic lung disease, potentially causing patients these are not appropriate or susceptible to subsequent oncological interventions (Furrkhu, 2013).

Semana's research (2014) on the relationship between smoking habits of patients with lung cancer at Dr. Wahidin Sudirrmosodo Makassar. This study used a descriptive analytic approach with a "case control" design. The population in this study were all lung cancer patients who were hospitalized at Dr. Wahidin Sudirrmosodo Makassar. The sample in this study consisted of 15 suffering from lung cancer and 15 without lung cancer with a total of 30 people. Data collection using a questionnaire. The results were processed using the chi-square test with a significance level of $\alpha = 0.05$. The bivariate results showed that the number of cigarettes inhaled (p = 0.001), the type of cigarette inhaled (p = 0.010), and the length of smoking (p = 0.003). The conclusion in this study is that there is a relationship between the smoking habits of the patient (number of cigarettes, type of cigarette and duration of smoking) with lung cancer at Dr. Wahidin Sudirrmosodo Hospital Makassar.

Cigarettes are an industrial product and an international commodity that contains around 3,000 chemicals. Important elements include: tar, nicotine, benzopyrin, methyl-chloride, acetone, ammonia, and carbon monoxide. Among the many harmful substances, there are 3 of the most important, especially in terms of cancer, namely: tar, nicotine, carbon monoxide (CO). Tar contains hundreds of chemicals, most of which are carcinogenic. Nicotine stimulates the release of catecholamines, which can increase heart rate. CO is 1-5% of cigarette smoke. This substance carries oxygen in the blood (erythrocytes) and forms carboxyhaemoglobin. A smoker will have carboxyhaemoglobin higher than normal people, about 2-1 5%. in normal people carboxyhaemoglobin is only about 0.5-2 ° / o. In addition, CO damages artery walls which in turn can lead to atherosclerosis and coronary heart disease. CO also damages the baby in the womb (Bustan, 2007).

According to the opinion of researchers, one of the habits commonly encountered in everyday life. Everywhere, it is easy to find smoking people, men, women, young children, elderly people, rich and poor; there is no exception. How smoking is a part of people's lives Cigarettes are one of the tobacco products that are intended to be burned, smoked and / or inhaled. The smoke contains nicotine and tar which contain hundreds of chemical substances, most of which are carcinogenic.
The results showed that from 43 lung cancer respondents, 39 (90.7%) of respondents smoked, this is in line with the theory which states that smoking is a bad habit that can damage health. In one cigarette contains 4000 types of substances that are harmful to health. Based on a report from WHO in 2003, smoking is the leading cause of preventable death in the world. Smoking can increase the risk of heart disease 2-4 times compared to nonsmokers. Smoking also increases the risk of death from lung cancer 20 times greater. However, there are still many people, especially in developing countries like Indonesia, who still have a low level of awareness of the dangers of smoking.

Toxins in cigarettes will accumulate in number in the body, especially in the lungs. The presence of this toxin will inhibit the process of exchanging O₂ gas with CO₂ in the alveolus. This condition will get worse as the number of cigarettes smoked increases. Alveolar damage is also very likely to occur due to smoking. This of course will reduce the number of functional alveoli that play a role in the respiration process. As a result there will be a decrease in the function of the organs.

Based on the results of the study, it is known that there are respondents who have lung cancer but as many as 4 (9.3%) of respondents do not smoke, this is due to other factors so that respondents have lung cancer such as a history of TB disease, the type of work that triggers lung cancer. such as respondents working in mining areas, printing companies, and others.

Of the 86 respondents who were not lung cancer, as many as 43 (50.0%) of respondents smoked according to the researchers due to the lack of accuracy of data on the number of cigarettes smoked in one day. The data obtained came from interviews with respondents. In addition, the researchers did not take into account other aspects of smoking habits such as the type of cigarette smoked, how to smoke cigarettes, and the length of time the respondents had a smoking habit, so that in this study there were respondents who smoked but did not experience lung cancer.

### The Relationship Between Family’s Cancer Inheritance and Lung Cancer

The statistical test results obtained p-value = 0.001, which means p <α (0.05). It can be concluded that there is a relationship between family history and lung cancer in Abdul Muluk Regional Public Hospital with an OR value of 4.472, it means that respondents with a family history of no descent have a 4 times chance of not having lung cancer when compared to respondents with a family history of offspring.

In line with Ernawati’s (2019) research on risk factors for lung cancer in women who were treated at the Lung Department of Dr. M. Djamil Padang and RSUD Solok. This study used a case control study design in 23 women with lung cancer as a case and 46 women without lung cancer as a control. It was carried out in the Lung Department of Dr. M. Djamil Padang and RSUD Solok during 2018. Samples were taken nonprobability using consecutive techniques. There was no significant difference in characteristics between the case and control groups. There is a significant relationship between exposure to cigarette smoke from parents with lung cancer in women (OR = 13.46 95% CI 95% 4.04-44.82; p = 0.0001). There was no significant difference in smoking (OR = 2.05 CI95% 0.12-34.26; p = 1.000), exposure to cigarette smoke from husband (OR = 2.97 CI95% 1.03-8.60; p = 0.074), exposure to cigarette smoke in the workplace (OR = 2.10 CI95% 0.28-15.92; p = 0.596), exposure to biomass smoke (OR = 1.22 CI95% 0.42-3.57; p = 0.928), a family history of malignancy (OR = 4.29 95% CI 0.37-49.95; p = 0.256) and a history of TB (OR = 0.25 95% CI; p = 0.253) with lung cancer in women. In conclusion, exposure to secondhand smoke is a major risk factor for lung cancer in women. Some genes contain instructions to control when cells grow, divide to make new cells and to die. Cancer can be caused by DNA changes that activate oncogenes or turn off tumor suppressor genes. Some people inherit mutated DNA from their parents which greatly increases their risk for certain cancers. This is very important in some families with a history of lung cancer (Husen, 2016).

Lung cancer is all malignancy in the lung, including malignancies originating from the lungs themselves (primary). In the clinical sense, primary lung cancer is defined as a malignant tumor originating from the bronchial epithelium (bronchogenic carcinoma). (Ministry of Health PNPKParu, 2017).

Pallis and Syrigos (2013) in Greece reported that women with a family history of cancer had a 2.01 times risk of lung cancer compared with women who had no family history of cancer. This difference was influenced by the majority of cases and controls in this study who did not have a family history of cancer. There are changes / mutations of several genes that play a role in lung cancer, namely Proton oncogene, Tumor suppressor gene, Gene encoding enzyme (Adisani, 2008)

In the opinion of researchers, cancer can be caused by DNA changes that activate oncogenes or turn off tumor suppressor genes. Some people inherit DNA mutations from their parents which greatly increase their risk for certain cancers. There are changes / mutations in several genes that play a role in lung cancer, namely Proton oncogene, Tumor suppressor gene, Gene encoding enzyme.

Matakidouw’s (2014) study found a significant increase in lung cancer risk associated with having an affected relative, the risk increases with the early age of the disease and with some affected family members. This
suggests that lung cancer risk may be partly genetically determined. However, family studies of lung cancer are problematic because they show high heterogeneity and it is usually impossible to make suitable adjustments for smoking, a major risk factor. Furthermore, twin studies and the increased risk of lung cancer associated with affected partners do not support genetic susceptibility. Such restrictions formally preclude drawing strong conclusions about the effect of genetics on lung cancer outside the context of rare Mendelian disorders. Ultimately, verification of genetic predisposition must come from causal identification. Recently, after genomewide association scans, a candidate loci for predisposition to lung cancer have been reported (Bailey-Wilson et al. 2004). If confirmed, this will provide the most compelling evidence to date of a genetic susceptibility to lung cancer.

According to the researcher’s opinion, it is known that from 43 respondents with lung cancer, as many as 20 (46.5%) of respondents are hereditary. This is in line with the theory which reveals that having a history of discharge who has had lung cancer is a genetic risk factor for a person to develop lung cancer too. However, this does not mean that every offspring will develop lung cancer because lung cancer is not inherited but his susceptibility is higher than family members who do not have lung cancer.

In this study, it was also known that 23 (53.5%) respondents did not have a descent from lung cancer but had lung cancer, this is due to other factors so that the respondents contracted lung cancer such as a history of TB disease, a type of work that triggered lung cancer, such as respondents working in mining areas, printing companies, etc., respondents have a heavy smoking habit.

Of the 86 respondents who did not suffer from lung cancer, as many as 14 (16.3%) of respondents had a lung cancer hereditarily. According to the researchers the respondents did not experience lung cancer, because lung cancer is not an inherited disease but has risk factors that make a person vulnerable. Not all respondents who hereditarily has lung cancer suffers from lung cancer. There are other factors that trigger lung cancer.

The Relationship Between Lung Disease (Tuberculosis) and Lung Cancer

The statistical test results obtained p-value = 0.039, which means p < α (0.05). It can be concluded that there is a relationship between history of TB and lung cancer in Dr. H. Abdul Moeloek, Lampung Province in 2020, with an OR value of 2.382 means that respondents with a history of TB disease have a 2 times chance of experiencing lung cancer when compared to respondents who have no history of TB disease.

According to Purba (2015), lung cancer is a malignancy originating from the outer side of lungs (lung tumor metastasis) or originating from the lungs itself, where abnormalities can be caused by a collection of genetic changes in the epithelial cells of the airways, which can result in uncontrolled cell proliferation. Primary lung cancer is a malignant tumor originating from the bronchial epithelium or bronchial carcinoma.

Although tobacco smoking is the leading cause of lung cancer in humans, there are no widely accepted estimation of the exposure-response relationship between smoking and lung cancer. This is partly due to the mistaken impression that the lung cancer association is so strong that little can be learned from additional attention to the issue. Since the analysis and description of the dose-response relationship involves such distinctive methodologies and parametrizations, there are actually not many published results that can be used to construct formeta analyzes or other attempts to synthesize knowledge. Finally, much remains to be learned about the mechanisms of carcinogenesis by studying valid and generalizable dose-response relationships. It is hoped that the addition of new evidence from studies like ours will increase the likelihood that a sufficiently representative estimate can be obtained from a world body of evidence (Remen, 2018).

Semana’s research (2014) on the relationship between smoking habits of patients with lung cancer at Dr. Wahidin Sudiruhsudo Makassar used a descriptive analytic approach with a “case control” design. The population in this study was all lung cancer patients who were hospitalized at Dr. Wahidin Sudiruhsudo Makassar. The sample in this study consisted of 15 suffering from lung cancer and 15 without lung cancer with a total of 30 people. Data collection was conducted using a questionnaire. The results were processed using the chi-square test with a significance level of α = 0.05. The bivariate results showed that the number of cigarettes inhaled (p = 0.001), the type of cigarette inhaled (p = 0.010), and the length of smoking (p = 0.003). The conclusion in this study is that there is a relationship between the smoking habits of the patient (number of cigarettes, type of cigarette and duration of smoking with lung cancer at Dr. Wahidin Sudiruhsudo Hospital Makassar.

The main complaints can be coughing or without phlegm, coughing up blood, shortness of breath, hoarseness, chest pain, difficulty swallowing, and a lump at the base of the neck. Symptoms or complaints due to extra pulmonary metastases, such as abnormalities arising from severe compression in the brain, enlargement of the liver, and weight loss are also features of lung cancer. (Indonesian Lung Doctors Association, 2013).

Although chronic obstructive pulmonary disease (COPD) and lung cancer are both caused by smoking, COPD is an independent risk factor for lung cancer. This means that if two people smoke the same amount, or if both don’t smoke, the person who has COPD will be more likely to get lung cancer. Overall, the likelihood that someone with COPD will develop lung cancer is two to four times higher than someone who does not have COPD,
and the risk is even greater among heavy smokers. Asthma also appears to be a risk factor. It is estimated that pulmonary fibrosis increases the risk of lung cancer by 40%. TB also increases the risk.

According to Emawati (2019), women with a history of TB have a 0.25 times lower risk of developing lung cancer than those without a history of TB. Our results are different from the theory that TB is a risk factor for lung cancer. This difference may be due to the selection of controls in this study. 15.2% were TB sufferers so there could be bias. A limitation that is often found and cannot be avoided is recall bias. Even though the questionnaire has been tested, there is still the possibility of forgetting about habits that are risk factors for lung cancer. This study has drawbacks because it does not examine other risk factors that may play a role in women such as the use of hormonal contraceptives. This study did not determine the degree of smoker from exposure to cigarettes by parents, husbands and workplace colleagues because of the difficulty in remembering the number of cigarettes exposed.

In the opinion of researchers, someone with COPD will have lung cancer two to four times higher than someone who does not have COPD, and the risk is even greater among heavy smokers. Asthma also appears to be a risk factor.

According to the researcher's opinion, from the results of the study, it was known that from 43 respondents with lung cancer as many as 29 (67.4%) of respondents had a history of TB disease, this is in line with research conducted by a team of experts from China Medical University who succeeded in proving this after observing 700,000 Chinese citizens, 4,480 among them were diagnosed with tuberculosis between 1998-2000. All participants were observed for their progress until the time span between 2001-2007. The results showed TB infection increased the risk of lung cancer by 10.9 times compared to healthy participants. The risk for TB sufferers is 0.263 percent, while for healthy people it is only 0.0241 percent. The risk of lung cancer can be even higher, becoming 16 times if TB is accompanied by chronic obstetric pulmonary disease (COPD). The risk of death from lung cancer also increases significantly with TB infection. For TB sufferers, the risk is 0.511 percent, while for healthy people the risk is much smaller, 0.082 percent. This research has not succeeded in determining what factors cause the two to be related. But at least, these findings reinforce the suspicion of experts so far that there is a link between tuberculosis and lung cancer.

Based on the results it is known and as many as 14 (32.6%) respondents had no history of TB disease, this is due to other factors so that the respondent contracted lung cancer such as a family history, a type of work that triggers lung cancer such as respondents working in mining areas, printing companies, and others, respondents have a heavy smoking habit

4. Conclusion

Lung cancer frequency distribution were 43 (33.3%) respondents and as many as 86 (66.7%) respondents were not lung cancer. The frequency distribution of risky occupations was 33 (25.6%) respondents, and as many as 86 (66.7%) respondents with non-risky occupations. The distribution of smoking frequency was 82 (63.6%) respondents, and as many as 47 (36.4%) respondents who did not smoke. The frequency distribution of family history with offspring was 34 (26.4%) respondents, and as many as 95 (73.6%) respondents with no family history. The frequency distribution of TB disease history was 69 (53.5%) respondents, and as many as 95 (73.6%) respondents with no family history.

Themes such as smoking, work, occupation, family history, and health status have a heavy smoking habit.

References


Biography / Biographies

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