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THE RESPIRATORY TRACT EFFECTIVENESS OF POST-GENERAL ANESTHESIA IN SMOKERS AND NON-SMOKERS IN PKU MUHAMMADIYAH OPERATING THEATERS OF BANTUL YOGYAKARTA

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Abstract

The respiratory tract effectiveness of post-general anaesthesia inhalation is greatly influenced by the condition of the respiratory system. The smoking habit causes inflammation of the respiratory tract especially on patients who have smoking record. They have a high risk of respiratory tract ineffectiveness of anaesthesia inhalation. This study aims to compare the effectiveness respiratory tract of post-general anaesthesia inhalation in smokers and nonsmokers in the PKU Muhammadiyah Hospital Operating Theater Bantul Yogyakarta. This study was categorized as a comparative study with a cohort approach involving 36 respondents who were taken by accidental sampling. The results this study was analyzed by Mann-Whitney analysis in purpose to explain that there were differences between smokers respiratory tract effectiveness and nonsmokers post- general anaesthesia inhalation in PKU Muhammadiyah Hospital Operating theatre in Bantul Yogyakarta with a significant value of 0,000 (p <0.05).

Keywords: *The Respiratory Tract Effectiveness; Smoking Habit; General Inhalation Anaesthesia.*

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1. Introduction

Smoking is an activity that we often meet in society, not only Indonesian but also people in a different country in the world (Ambarwati et al., 2014). According to the World Health Organization (WHO) there are 1.3 billion tobacco products users worldwide, and the case of the deaths caused by cigarettes reach 4.9 million people per year (Irmayanti, 2015). Then, Indonesian smokers categorized in alarming level in consuming tobacco products, especially cigarettes (Health Ministry of the Indonesian Republic, 2016). Huda explained that currently, Indonesia gains the third-highest active smokers in the world, after China and India. Even more, that is a fact aggravated by the increasing stats of younger generation smoking habits (Huda, 2016).

The Global Adult Tobacco Survey (GATS) (2011) also showed the prevalence of Indonesian smokers, namely, 36.1%, or it is equivalent with 67.4% of men in Indonesia were smokers and 4.5% were female smokers. The research results obtained by Health's R&D Ministry Agency in 2010 showed that death case of tobacco-related diseases occurred to 190,260 people or around 12.7% of all deaths in the same year

The research result conducted in the Bantul Regency, Yogyakarta showed that the percentage of over ten years old smokers who smoke every day is 21.1%, and smokers rarely smokers 5.7%. This data drives Bantul regency equal with Yogyakarta city by smoker prevalence of 47.0% which has the highest smoker prevalence from the other regencies in the Special Region of Yogyakarta (Yogyakarta Basic Health Research, 2013).

According to the WHO expert committee on smoking control, cigarettes are a major cause of chronic bronchitis and pulmonary emphysema. A smoking habit can affect the structure and function of the respiratory tracts and lung tissue. The effectiveness of the respiratory tract and oxygen saturation (O2) after anaesthesia, especially general anaesthesia, inhalation is strongly influenced by the state of the respiratory system (Saminan, 2013).

The research conducted by Kumanda, et al. (2015), the phenomena that occur in the research site especially, smokers' patients who performed general anaesthesia, inhalation often occurs the mucus hypersecretion, related to the physiological reflexes of the body malfunctioning resulting in accumulation of the respiratory tract. Smokers have a reduced

ability to carry oxygen in the blood so that many patients are found with respiratory tract emergencies due to respiratory tract obstruction, and it often decreased consciousness level so that patients cannot breathe properly or suffer respiratory depression (Mangku, 2010).

The reports from "The Anesthesiology Study Commission of the Philadelphia County Medical Society" explain that nearly half of postoperative deaths occur in the first 24 hours after surgery with general anaesthesia and can reach 70% in high-risk patients, (Firman 2013), Apriliana et al., 2013). Postanesthesia, especially general anaesthesia, inhalation is a vulnerable period for patients associated with awareness and complications (Mangku, 2010). The impact of the ineffectiveness respiratory tract after anaesthesia is a stage that often causes severe problems, and if it didn't handle properly, it could cause death.

The Complications that occur in post-anaesthesia are also very complex, with latest anaesthesia techniques it can reduce post-anaesthesia complications. However, it is very unwise if we assume that complications will not occur (Amon, 2013). Therefore, if the patient smokes, that habit should be stopped before anaesthesia is done, i.e. for 8 weeks to fix the respiratory tract tract, or for 2 weeks to reduce respiratory tract tract irritability, and at least 24 hours before anaesthesia during surgery in purpose to reduce the levels of Carboxyhemoglobin in the body. Besides, the smoking habit cessation in a few days or a few weeks can activate the work of cilia respiratory tract tract, and it can reduce the production of sputum in post-general inhalation anaesthesia (Gwinnutt, 2014).

2. Method

This research was categorized as a comparative study with a cohort approach. The researchers identify independent variables (risk factors) retrospectively which has divided into two groups, namely smokers (positive risk factors) and non-smokers (negative risk factors) and then observations are made in purpose to see the effect on dependent variables namely, the effectiveness of the respiratory tract tract in both groups today based on recorded data in the past (Dharma, 2013).

The population in this study were all patients of post-general anaesthesia inhalation in the PKU Muhammadiyah Hospital Operating Theater Bantul recorded in three months namely August, September, and October 2016 then, as the target population was total 121 people and the people who in the scoop of the study was 40 people.

The sampling technique used was Non-Random Sampling technique and accidental sampling method as a method for determining the sample. That method is applied in the way taking cases or respondents who available in somewhere according to the research context, ie the patient who agreed to be a research respondent, postoperative patients with general anesthesia inhalation technique Laryngeal Mask Respiratory tract (LMA), Endotracheal Tube (ETT), or Face Mask (FM), 12-45 years old, elective or cito surgery patients, ASA I and II physical status and patients do not have respiratory system diseases such as Tuberculosis (TB), Emphysema lung, lung abscess and chronic bronchitis.

The calculation of the total samples number in this study using the Slovin formula (Nursalam, 2016). As a result, the number of samples in this study was 36 respondents, 18 smokers and 18 nonsmokers. Both of them will compare especially their effectivity of respiratory tract between the two respondents. This research was conducted in the PKU Muhammadiyah Operating theatre Hospital Bantul Yogyakarta on May 12, 2018, until July 3, 2018.

The research data analysis use a computer program, namely the Mann-Whitney test (test of two independent groups). This program is used in purpose to find out whether there is differences parameter of two independent samples namely, comparing the effectiveness of the respiratory tract in post general anaesthesia inhalation of smokers and nonsmokers (Riwidikdo, 2012).

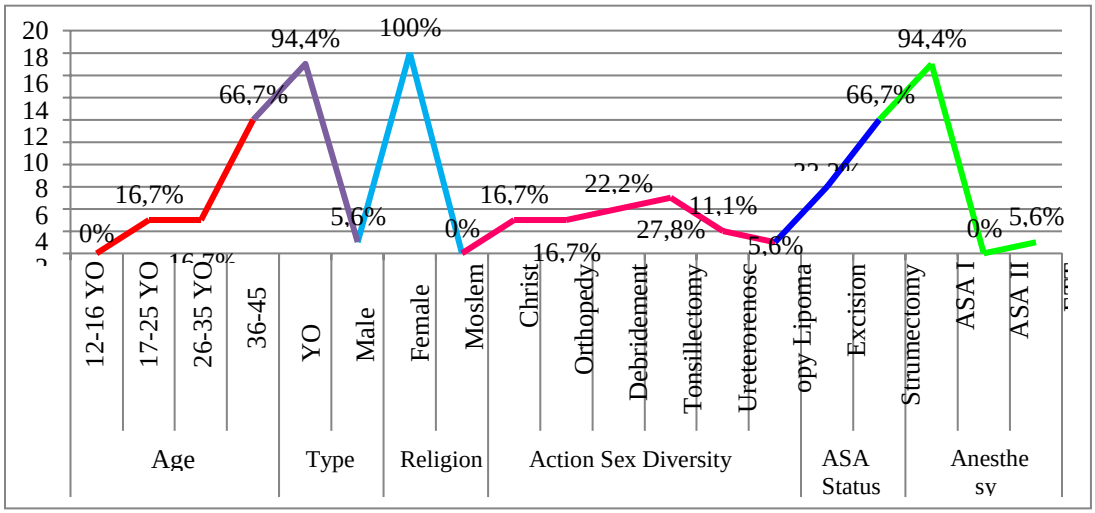
3. Results and Discussion

Univariate Analysis

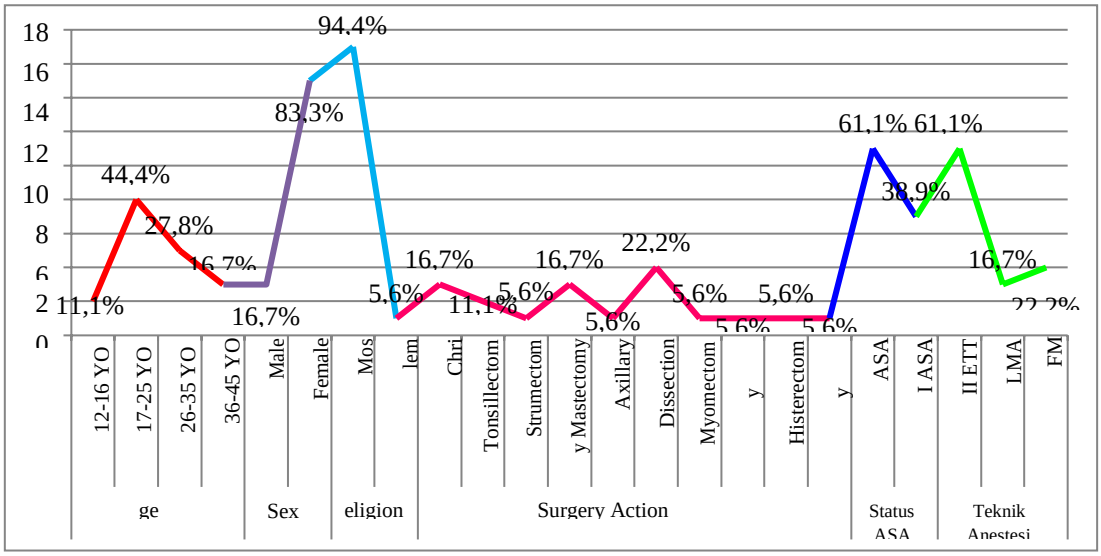
The characteristics distribution of smoker patients in graph 1 explains that most of them are 36-45 years old by a total of 12 people with a percentage of 66.7%, the majority of smokers are the male total 17 people (94.4%) and 1 woman with a percentage 5.6%, while (100%) patients or 18 people are Muslim. Then the majority of surgery performed by patients as many as 5 people (27.8%), namely ureterorenoscopy, where most patients with ASA II physical status are 12 people (66.7%) and inhalation anaesthesia techniques in most patients with Endotracheal Tube (ETT) as many as 17 people (94.4%).

The results of the characteristics distribution in graph 2 explain that there were 8 nonsmokers aged 17-25 years with the largest percentage being 44.4%, male gender as many as 3 people (16.7%) and most were female namely 15 people (83.3%), the majority of patients were Muslim with a percentage of 94.4% or 27 people, the surgical procedure that was undertaken by patients on average was lumpectomy surgery of 4 people (22.2%) with the majority of patients in the ASA I status, i.e. 11 people (61.1%), and Endotracheal Tube anaesthesia techniques (ETT) are the majority of the techniques used or 61.1%, i.e. 11 people.

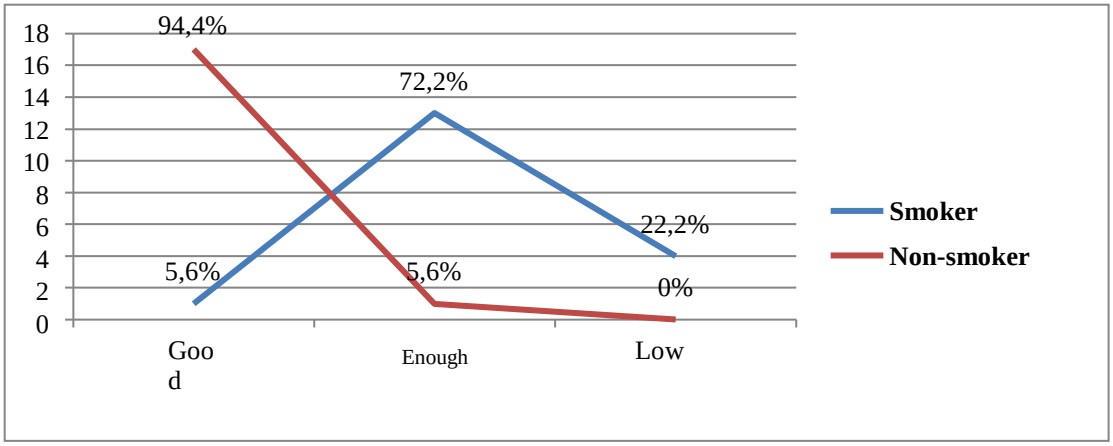
Graph 1. The Patient Frequency Characteristics Distribution of Smokers Based on Age, Gender, Religion, Surgical Actions, ASA Physical Status and Anesthesia Techniques, in the PKU Muhammadiyah Operating theatre Hospital Bantul Yogyakarta



Graph 2. Non-Smoker Characteristics Patients Frequency Distribution based on Age, Gender, Religion, Surgery, ASA Physical Status and Anesthesia Techniques, in the Operating theatre of PKU Muhammadiyah Hospital Bantul, Yogyakarta



Graph 3. Cross-tabulation of the smokers' respiratory tract effectiveness and non-smokers post-general anaesthesia Inhalation in the PKU Muhammadiyah Operating theatre Hospital Bantul Yogyakarta



The results of the cross-tabulation in graph 3 state that the most of smokers' patient effectiveness of the respiratory tract is enough as many as 13 people (72.2%), with 4 people (22.2%) the effectiveness of the respiratory tract is less, and the effectiveness of the respiratory tract is good there is 1 person with a percentage of 5.6%. While the efficacy of good respiratory tract is mostly owned by nonsmokers namely 17 people or 94.4%. There are one patient (5.6%) with sufficient respiratory tract, and there are no nonsmokers patients with the less effective respiratory tract

Bivariate Analysis

The data analysis results obtained from test results by calculating Z value is -4.889 and 0.000 significant. The negative sign (-) in the estimated Z value is ignored (absolute). When compared with the Z table with 5% significance, the Z table is 1.96. Hypothesis testing requirements are if Z count > Z table then Ha is accepted. The data in table 4.5 shows that the value of Z huting> Z table or it is -4,897> 1.96 with an Asymp value. Sig. 0,000 shows that p<0.05, then Ha is accepted, it means that there is a significant difference between smokers and nonsmokers in the respiratory tract effectiveness in post-general anaesthesia inhalation

Tabel 1. Mann-Whitney Test Table and The Effectiveness of Respiratory tract Post-General Anesthetics Inhalation in Smokers and Non-Smokers

	Respiratory tract Effectivity
Mann-Whitney U	8,500
Wilcoxon W	179,500
Z	-4,897
Asymp. Sig. (2-tailed)	0,000

The Respiratory tract Effectiveness in Post-General Anesthetics Inhalation in Smokers Patients

A smoking habit can cause changes in the structure and function of the respiratory tracts and lung tissues. Consuming cigarettes more often and long periods will cause a decrease in lung function, and it causes damage to the respiratory system. From research conducted by Putri (2015) states that smoking can be a risk factor of 5.529 times the decline in vital lung capacity compared to nonsmoking habit. Data from graph 3 indicates that the effectiveness of respiratory tract smokers is mostly in enough category, namely 72.2% or 13 patients from 18 patients who experienced surgery. Also, there were 4 patients (22.2%) with less effective respiratory tract and only 1 patient (5.6%) out of 18 smokers with effective respiratory tract who has a good category.

The results of this study indicate that smoker patient has a higher risk of experiencing respiratory tract ineffectiveness. It is proven by only 1 patient with a good respiratory tract category after surgery is performed general anaesthesia inhalation. The results of this study are in line with the study conducted by Sukmawati (2016) which explain that there is a relationship between smoking and respiratory tract obstruction by Spearman Rank correlation analysis and the Spearman correlation coefficient is -0.536. It shows a negative correlation and a p-value <0,0001. Based on observations in this study, the overall results of smokers with post-general anaesthesia inhalation experienced mucus hypersecretion, which further it can cause the patient to experience respiratory tract obstruction. Excessive mucus in the patient's respiratory tract inhibits the fulfilment of oxygen (O2) equal with the needs of the patient so that oxygen saturation falls below 95%. This situation stimulates the emergence of cough and holds the breath in the patient so that the patients often experience dyspnea due to lowering the respiratory tract clearance that can trigger laryngospasm.

Providing this anaesthetic, especially general anaesthesia, has a significant risk. It is related to the effectiveness of the respiratory tract due to excessive mucus production, coughing, bronchial spasm, and dyspnea due to inflammation. These inflammation respiratory tracts are caused by smoking habit as the results of the data in graph 3 above explain that the respiratory tract effectiveness value of post-surgical smoker with general anaesthesia inhalation techniques are mostly in the enough and low categories. This case is caused by the changes in the structure and function of the respiratory tract, which caused by consuming cigarettes when patients undergo surgery with general anaesthesia techniques. Then, these anaesthetics substance enter the body through the respiratory tract of patients. The patient will be faced a high-risk respiratory tract ineffectiveness. In line with research by kumanda (2015) which explains that there is a relationship between smoking and the incidence of intra-anaesthesia mucus hypersecretion (p = 0.017) with the prevalence of hypersecretion will going up into 2,593 times in patients who have the smoking habit compared to non-smoking habit. Therefore, monitoring and handling the respiratory tract obstruction, which is experienced by the patient is very important to be done so that the acceleration of the respiratory tract effectiveness can run quickly and effectively on the patient. The medical history of a pre-operative patient is important information, a careful assessment is expected can reduce the risks that would face by the patient's condition.

The Respiratory tract Effectiveness of Post-General Aneathesis Inhalation in Non-Smoker Patients

Non-smoker patients who are conducting the surgery by general anaesthesia inhalation in PKU

Mummadiyah Operating theatre Hospital Bantul, based on graph 3 shows 17 patients (94.4%) had an respiratory tract effectiveness post-anaesthesia included in the good category and there were 1 (5.6%) patients with enough respiratory tract effectiveness category. This data shows that nonsmokers have better respiratory tract effectivity values than smokers in post-surgery with general anaesthesia inhalation technique, which is 1 patient (5.6%) with good respiratory tract effectiveness. The research results support this results of this study by Rahim (2011) which states that the majority of non-smoke have good respiratory tract effectiveness with a percentage (81.80%) if it is compared with the rate of people who smoke namely, (54.50%).

Based on the theoretical explanation that inside of the body, the cigarettes affected the increase of mucus secretion in the respiratory tract and slowed the movement of cilia (eyelash) contained in the walls of the respiratory tract. As a result, the ability of cilia to counter foreign substance and mucus is reduced. The walls of the respiratory tract will become irritated and cause interference in breathing (Putri, 2015). Also, research by Inayatillah (2014) states that there are significant differences in the CO_2 levels in the air of expiratory smoker group if it is compared to the nonsmoker group. A person who does not smoke has a high level of sensitivity to CO_2 emissions when given O_2 in post-anaesthesia, the changes in O_2 levels are felt to be enough for nonsmokers. However, in fact, non-smokers also have risk of oxygen deprivation, so intensive care must be taken to take maximum care after surgery with general anesthesia so that the SpO_2 value is at minimum 95% and also the signs of respiratory tract obstruction such as mucus hypersecretion, laryngospasm, dyspnea and breathe sounds in an adequate and optimal state.

Therefore, it is necessary to prepare before the patient underwent surgery, especially surgery with general anaesthesia inhalation techniques. The patient's smoking history is very important to assist nurses in assessing the effectiveness of the patient's respiratory tract, where the patient is better advised to stop smoking in the previous 8 weeks to improve the respiratory tract condition, 1-2 weeks to reduce respiratory tract irritability and at least 24 hours of pre-anaesthesia which can help to reduce carboxyhemoglobin levels in the body that affect the effectiveness of the respiratory tract (Gwinnutt, 2014).

The Effectiveness Comparison of the Respiratory tract in post-General Anesthetics Inhalation in Smokers and Non-Smokers

After observing the 36 respondents in which 18 respondents were smokers, and 18 other respondents were non-smokers, the effectiveness of the respiratory tract after general anaesthesia inhalation was obtained at the PKU Muhammadiyah Operating theatre Hospital in Bantul. From the results of Mann-Whitney tests. It is obtained Z count> Z table with the significance of the results p <0.05, then Ha is accepted. The z value of the table with a significant level of 5% is 1.96, then Z count (4.897)> Z table (1.96) with Asymp. Sig. 0,000 <0.05, which means there is a difference in the respiratory tract effectiveness in post-general anaesthesia inhalation in smokers and nonsmokers at PKU Muhammadiyah Operating theatre Hospital Bantul Yogyakarta.

The results of this study supported the previous research by Defri Amon (2013) which resulted that the study was stating 77.8% of respondents smokers with ineffective respiratory tract and vice versa 72.2% of nonsmokers with respiratory tract effectiveness both post-operation at At-Turost Al-Islamy Hospital. Theoretically, the first hour after surgery with general anaesthesia inhalation is a dangerous time, because patients with respiratory tract reflexes still depress breathing (Mangku, 2010). Patients who usually consume cigarettes / smokers during recovery (Emergency) from general anesthesia inhalation, can stimulate the emergence of cough, hold breath, decrease oxygen saturation (below 95%), reduce the respiratory tract clearance, especially increased mucus, can ultimately trigger laryngospasm, atelectasis and pneumonia so that after surgery patients, they have a high risk for complications (Salombe, 2014).

Postoperative oxygen saturation with general anaesthesia inhalation is also important for the effectiveness of the respiratory tract. In connection with this study, research by Salombe (2014) is a study of peripheral oxygen saturation in post-general anesthesia inhalation in smokers and nonsmokers at Prof. RSUP Dr RD Kandou Manado with the results of the study stated that peripheral oxygen saturation after general inhalation anaesthesia in smokers tends to be at risk of decreasing peripheral oxygen saturation (below 95%) with an average value of 97.59 compared to peripheral oxygen saturation in nonsmokers, i.e. with an average value of 99.82.

Previous research has been conducted by Sudiatmika (2011), he examined the difference in conscious recovery time in smokers and nonsmokers with general anaesthesia inhalation at IBS Undata Public Hospital, Palu. The results obtained showed that the majority of nonsmokers (85%) showed a faster recovery time compared to smokers who only (38.8%).

Several studies about the effects of smoking toward the respiratory tract and oxygen saturation also support differences in the effectiveness of the respiratory tract in smokers and nonsmokers, especially after surgery with general anaesthesia inhalation. Respiratory irritation is one of the most important characteristics of anaesthetic agents, especially when they are used for induction of inhalation anaesthesia. General conditions that must be considered in general anaesthesia inhalation is to

keep the respiratory tract running smoothly and regularly. For that reason, the things that respondents can do to avoid the grave situation are mainly to reduce smoking and stop smoking before undergoing surgery. Then, based on the results of this study which states that there is a comparison between of the respiratory tract post-general anaesthesia inhalation effectiveness in smokers and nonsmokers who are undergone in the PKU Muhammadiyah Operating theatre Hospital Bantul Yogyakarta.

4. Conclusion

Based on the results of research and discussion it can be concluded is a difference in the effectiveness of the respiratory tract in post-general anaesthesia inhalation on smokers and non-smokers at the PKU Muhammadiyah Operating theatre Hospital in Bantul Yogyakarta.

5. Strength And Limitations

This study has the power on data used, which is data case and control so that it can draw the situations that have the same character as the situation with the other situation. Therefore, the data that is gotten is more controlled.

Variables that become a nuisance such as Age, Gender, Respiratory Disease, Duration of Operation and Smoking status are the conditions in which respondents may be the same. So, in future, the research is expected to have an answer to how far the effects of these factors on the respiratory tract effectiveness.

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