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# EFFECT OF ADMINISTRATION OF RED GINGER AND GARLIC EXTRACT ON CHANGES IN IMMUNOGLOBULIN G (IG-G) IN CHILDREN AGED 8 YEARS SUFFERING FROM BRONCHIAL ASTHMA IN THE WORKING AREA OF THE TANJUNGPINANG CITY HEALTH CENTER

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**ABSTRACT**
The bioactive components in red ginger consist of gingerols, shogaols, and zingerons which are a group of phenolic compounds. The oleoresin ginger bath ranged from 3.2-9.5%, while the content of gingerol in oleoresin was between 14-25% and shogaol in oleoresin was between 2.8-7.0%, which were investigated for their anti-inflammatory, antioxidant, antibacterial and anti-platelet properties.. Garlic also contains essential oil components, which have antibacterial activity that works by inhibiting the formation of bacterial cell membranes. The research design was a cohort analytic observational study with a prospective design. Sampling was carried out by purposive sampling method and obtained 34 child respondents with a history of or currently experiencing asthma, with 24 boys and 10 girls. This research was conducted in the Work Area of the Tanjungpinang City Health Center and was approved by the Research Ethics Commission of the Jakarta I Ministry of Health Polytechnic with Number 130/KEPK/VIII/2018. Data were analyzed using Chi Square. The results showed that there was a change in IgG control values in this case seen from changes in oxygen saturation in the blood of 4.06 g, namely before (91.38%) and after (95.44%) in children with beta-agonist effects that work with smooth muscle relaxation (ASM).



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## 1. INTRODUCTION

Asthma is a non-communicable disease with a high number of cases found in society (Ministry of Health of the Republic of Indonesia, 2008). Asthma is an inflammatory airway disease that can affect all age groups. Asthma is characterized by recurrent attacks of shortness of breath and wheezing which vary for each individual in severity and frequency. WHO estimates that 235 million people worldwide suffer from asthma and the number is expected to continue to be well controlled, 8% are not fully controlled (Rengganis 2008 in Katerine et al 2014. The main goal of asthma management is to achieve and maintain controlled asthma, so that attacks can be prevented at night and during the day and patients can still do physical activity (Global Initiative for Asthma, 2012 The prevalence of asthma continues to increase (5-30% in the last decade) and more than 50% of current sufferers are children.A retrospective study conducted by The UK Wide National Asthma Management Study in conjunction with Tayside Asthma Management.An initiative involving 12,203 respondents showed that asthma attacks are most common in children younger than five years old( 37%) (1,2).

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Asthma cases in the world are quite large, based on the World Health Organization (WHO) in 2011 estimates that 100-150 million world people suffer from asthma, this number is expected to continue to increase by 180,000 people every year. If it is not prevented and handled properly, it is estimated that there will be an even higher increase in prevalence in the future and interfere with the process of child development and the quality of life of patients.

In Indonesia, asthma is still seen as a common disease. Not to mention the problem of medical expenses which are still a luxury item in our country. The complexity of the problem of asthma in Indonesia causes its effects to seep everywhere. Based on RISKESDAS (2013) there is an increase in the prevalence of asthma with age, that aged 25-34 years has a prevalence The highest prevalence of asthma is 5.7% and age <1 year has the lowest asthma prevalence of 1.5%. (3).

Based on data from the Tanjungpinang City Health Office in 2014, there were 2949 cases of asthma sufferers where there were 1589 (53.88%) cases in male patients and 1385 (46.96%) cases in women, of which there were 537 (18.20%) cases of boys. -boys and 481 (16.31%) cases of girls suffering from asthma. In 2015 there were 1656 cases of asthma sufferers where there were 939 (56.70%) cases in male patients and 717 (43.29%) cases in women, of which there were 340 (20.53%) cases of boys and 225 (13.58%) cases of girls with asthma. And the latest data in 2017 there were 2601 cases of asthma sufferers where there were 1230 (47.28%) cases in male patients and 1371 (52.71%) cases in women of which there were 515 (19.80%) cases of boys and 419 cases (16.10%) cases of girls suffering from asthma. And there were 141 cases of boys aged 3-8 years who had asthma. Even though there was a decrease in 2015, there was an increase in children suffering from Asthma again in 2017. From the data above it can also be seen that there are more cases of children with boys than sufferers of girls (1).

One of the efforts to prevent disease is by increasing the effectiveness of the body's immune system so that immune cells can continue to fight the causes of disease and the body can be protected from various diseases. When a disease attacks, the body's immune system will kill the cause of the disease with an indirect mechanism, namely by increasing cell resistance. The immune system refers to the body's ability to identify and repel potentially harmful microorganisms. This ability allows the body to fight and prevent infection and disease. Antibodies are protein globulins (immunoglobulins) that react specifically with the antigens that stimulate their production. Depending on the type, the main immunoglobin in human blood serum is IgG which comprises 70-75 percent of immunoglobulins. Immunomodulators are substances or agents that can act with the immune system and cause an increase or decrease in specific aspects of the immune response. Sometimes the human immune system decreases which is usually caused by several factors such as the environment such as stress, illness, changes in temperature. Chemical compounds that can help boost the immune system can be obtained from plants. Medicinal plants that work on the immune system not only work as effectors that directly deal with the cause of the disease, but work through regulating immunity (4).

The archipelago was once known as the spice archipelago because of the many essential plants that were originated and cultivated, until now there are more than 40 types of essential oils that have the potential to generate foreign exchange (5). One of the well-known essential plants is ginger (Zingiber officinale Rosc). This perennial herb is a member of the Zingiberacea family, most useful in the tropics. Aromatic and spicy ginger rhizomes are used as a spice, seasoning, and source of medicine (Heyne) Ginger has been used extensively in India and China since before our era, and was traded. The spread of the use of ginger in Indonesia is very wide, as evidenced by the many ethnic dishes and the many regional names that mention ginger. In the world of agriculture, three cultivars (varieties) of ginger are known based on the size and color of the rhizome skin, namely elephant ginger (rhinoceros), emprit ginger (ordinary) and red ginger (berem). Chemotaxonomies can use various secondary metabolites, such as flavonoids (phenols), terpenes, alkaloids, lignans, sterols, waxes, fats, tannins, sugars, gums, suberin, resins, carotenoids and others, but the compounds most often used are phenols, alkaloids, terpenoids and non-protein amino acids. These compounds have diverse chemical compositions, are widely distributed and have various functions (6). Ginger has traditionally been used to treat rheumatic diseases, asthma, stroke, toothache, infection, muscle pain, sore throat, cramps, hypertension, nausea, fever and diabetes (Ali et.al, 2008). The main ingredients of ginger are essential oils (1-5%), sesquiterpenoids and monoterpenoids, gingerols, shogaols, paradols and zingerons (7).

In Indonesia, fresh ginger is used as an ingredient in herbal medicine and plays a role in traditional medicine. These bioactive components include gingerols, shogaols, and zingerons which are a group of phenolic compounds). Ginger oleoresin soaks ranged from 3.2-9.5%, while the content of gingerol in oleoresin was between 14-25% and shogaol in oleoresin was between 2.8-7.0%. Gingerol has been studied to have analgesic, sedative, and antibacterial effects in vitro and in vivo. The ginger shogaol compound extracted with hexane was studied to have the effect of antifouling agents (5). In research Elizabeth Townsend doctor at Columbia University Department of Anesthelogy stated that ginger or hot pepper root can help asthma sufferers breathe easier. In that study, researchers investigated whether ginger components could increase the effects of beta-agonists. Asthma drugs called beta-agonists work by relaxing the smooth muscle (ASM) tissue in the airways.

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In 0.5% aqueous solution, garlic can kill typhoid bacilli in 5 minutes. Garlic gum, garlic extract and allicin all appear to have bacteriostatic and bactericidal effects against staphylococci, meningococci, diphtheria bacilli, tuberculosis bacilli and vibrioclerae. In liquid medium, garlic can inhibit the growth of tuberculosis bacilli but the bacteriostatic effect may be reduced in the presence of serum. . Asthma, cough (Acute Respiratory Infection / ARI) and colds (7).

## 2. RESEARCH METHOD

The research design is using a quasi experiment. And the research design used is the nonequivalent pre-test and post-test design approach. Sampling was done by purposive sampling technique. The inclusion criteria in this study were children with a history of or currently experiencing asthma, totaling 34 children aged 8 years, with 24 boys and 10 girls and the exclusion criteria were respondents who died during the study. This research was conducted in the Work Area of the Tanjungpinang City Health Center and was approved by the Research Ethics Commission of the Jakarta I Ministry of Health Polytechnic with Number 130/KEPK/VIII/2018.

Data collection used an observation questionnaire sheet instrument related to Immunoglobulin-G, age, and gender. Univariate data analysis for age, sex characteristics. The results of the analysis of the numerical data show the mean, median, standard deviation, and p-value. Bivariate analysis to determine the effect of red ginger and garlic extract on changes in Immunoglobulin G (IgG).

## 3. RESULTS AND ANALYSIS

In this study, the majority of respondents were male (70.9%) and 29.4% female. The body mass index of most respondents was in the normal category and only 2 respondents had comorbidities (table 1). The results showed that administration of the extract increased blood oxygen saturation levels by 4.06 g before (91.38%) and after (95.44%) in healthy and sick children. The results of the T test obtained p value = 0.000, meaning that there was a statistically significant difference in oxygen saturation control levels between before and after giving ginger extract to healthy children and sick children to the administration of Red Ginger and Garlic Extract. (Table 2).

Table 1. Distribution of respondents based on Gender

| Variable | Frequency | Percent |
|---|---|---|
| Male | 24 | 70.6 |
| Female | 10 | 29.4 |
| Total | 34 | 100.0 |

Table 2. Differences in IGG Control Values of children with asthma before and after administration of Red Ginger and Garlic Extract

| EXTRACT ADMINISTRATION | MEAN | SD | P VALUE |
|---|---|---|---|
| Before | 91.38 | 2.6 | .000 |
| After | 95.44 | 1.6 | |

## 4. CONCLUSION

Administration of red ginger and garlic extracts has an effect on changes in IgG control values in this case seen from changes in oxygen saturation with the effect of beta-agonists that work with smooth muscle relaxation (ASM). There was a change in data between before and after being given Red Ginger and Garlic Extract with a p value of 0.012, healthy children (0.000) and sick children (0.012) which means <0.05. The effective

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