INTRODUCTION

Asthma is a chronic respiratory disease with clinical manifestations in the form of coughing, wheezing, shortness of breath, recurring or chronic, reversible, tends to worsen at night or early morning and is most commonly found in children. There are at least more than 800,000 children aged 5-14 years with asthma in 100 countries and has a high prevalence in developing countries with lower middle income. Based on the frequency of symptoms, asthma is divided into intermittent asthma and mild, moderate and severe persistent asthma.

Until now, the etiology of asthma is still being debated, but in general the occurrence of asthma is influenced by two factors, namely genetic factors and environmental factors. The second biggest trigger of asthma is house dust mites. This is in line with the report of the Allergy-Immunology sub-section of the Pediatric Department at Cipto Mangunkusumo Hospital Jakarta which shows that 45% of children with asthma Aeroallergen triggers are sensitive on the house dust mite through skin pinch test.

There are three species of house dust mite which are the main sources of allergens, namely Dermatophagoides pteronyssinus, Dermatophagoides farinae, and Glycyphagus destructor. In general, house dust mite is round or oval which is divided into four parts, consisting of the mouth and surrounding areas (gnatosoma), the leg pairs I and II (propodosoma), the third and fourth leg pairs (metapodosoma), and the posterior area (opiostoma). Nymphs and adults from house dust mite have four pairs of legs, namely two pairs of front legs and two pairs of hind legs, while the larvae have three pairs of legs and do not have genitals.

House dust mite stool is the main allergen, although the mite body itself, even the dead house dust mite are also potential allergens. This is because the antigen in dust mites that can trigger the main allergy lies in the house dust mite digestive tract. Patients with allergies to house dust mite have specific antibodies against allergens group I (der p1) and group II (der p II). Therefore, more than 95% of house dust mite allergens came from faecal particles containing strong allergens from group I (der p 1) and group II (der p II).
These allergens can stimulate the sensitization phase of bronchial asthma with the proliferation of T-Helper 2 (Th2) resulting in the activation of Immunoglobulin E (IgE) which will increase the permeability of the bronchial epithelium and cause the allergens to be captured by dendritic cells in the subendothelial tissue thereby increasing the occurrence of inflammation and edema which can cause asthma\textsuperscript{18,19}.

House dust mite is found in dust because dust contains a lot of dead skin flakes or scales, especially on the bed. The bed is the main habitat for house dust mite because on the bed there are a lot of squama which is food for house dust mite, the length of time using the mattress determines the level of house dust mite allergens because the longer it is used, the more feces will enter between the bed fibers, supported by increased humidity due to evaporation of sweat on the bed.\textsuperscript{14}

According to the habitat, the role of the criteria for a healthy house is very important for the growth and development of house dust mite, where one of the criteria for a healthy house according to the 1999 Minister of Health Decree is the absence of dust, the total dust is not more than 150µg/m\textsuperscript{3}, and the house is not made of materials that can grow, and the development of pathogenic microorganisms\textsuperscript{15}.

Based on the results of the 2018 Indonesia Health Research analysis of Asthma triggers, five main factors were found, one of which was the sensitization of house dust mites starting at the age of nine months. There are many studies regarding the correlation between house dust mite and asthma, but only a few have studied the density of house dust mite with pediatric asthma patients. Therefore, researchers are interested in discussing the correlation between house dust mite density and the incidence of bronchial asthma in children.

METHOD

An analytic observational study method using cross-sectional study design took place from June to October 2020. This study involved 25 respondents. Respondents are asthmatic children aged 3 to 11 years who diagnosed by the doctor using criteria from Indonesia Pediatric Asthma National Guideline 2015 and met the inclusion criteria by approved the consent form as a sign that they were willing to become respondents and willing to lend their house to collect dust samples in the child's bedroom. There are a confounding variable, namely the score of the criteria for a healthy house based on the observation sheet issued by the Ministry of Health, it has three aspects for healthy house assessment, which are: house component, sanitation facilities and occupant behavior. Healthy house categories are divided into two as if healthy and unhealthy house based on scoring from questionnaires and interviews, if the score > 1068 was categorized as healthy house. Dust sampling was collected in the respondent's bedroom, namely children who had been diagnosed with bronchial asthma. The identification processed using the floating method and microscopic examination. Thus calculation of dust mites density per gram conducted with the following formula:

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\text{House Dust Mite (HDM) density} = \frac{\text{dust mass (g)}}{0.1 \times \text{amount of HBT in 0.1 g of dust}}
\]

House dust mites density then determined into three categories as low (1-3), moderate (4-6), and high ( >6) for each 0.1 gram. The identification processed was done at the Parasitology Laboratory, Faculty of Medicine, Diponegoro University, Semarang Indonesia. Data from respondents were analyzed using a software program. Non-parametric test with lambda correlation test.

Ethical Approval

All research procedures received ethical clearance from the Health Research Ethics Commission of the Faculty of Medicine, UNDIP Semarang before conducting the research. The Ethical Clearance number is 68/EC/KEPK/FK-UNDIP/VI/2020.

RESULTS

Respondents in this study were children aged 3-11 years who had been diagnosed with asthma by a doctor based on PNAA criteria. The respondent's identity, address and asthma history were taken from medical records. The researcher went to the respondent's house and collected the dust sampling, especially in the children's room, followed by observations of healthy house which were assessed by questionnaires and interviews. Research respondents have characteristics in accordance with frequency (table 1)
The results of this study show that a healthy house is associated with house dust mite density (p<0.05). This is in line with study conducted by Subahar et al, in 2019 regarding the Effect of Temperature and Humidity on the Existence of house dust mite. The temperature and humidity of a room affect the habitat and development of house dust mite. During its life, House dust mite’s does not drink water but takes water from the air, so that the humid air is very helpful in the development of life for HOSP. Temperature is an influence because house dust mite requires an optimal air temperature of 25 - 35°C for its development, this is in line with this study because Semarang has an average temperature of 27.5°C and an average air humidity of 75% which is the optimal temperature & humidity for house dust mite. So that a humid room with little sunlight and dust becomes a good habitat for the growth and development of house dust mite.

The data of this study showed a correlation between the density of house dust mite and the category of the house (p> 0.05). It can be seen that there is a trend of decreasing of house dust mite’s density in houses with a healthy category, while those with an unhealthy category have an increasing trend (table 2).
In this study, the results were not significant between house dust mite density and asthma status. This can be due to several things, such as in this study not all respondents had a trigger factor, namely house dust mite, so that if the respondent's asthma status was correlated with the density of house dust mite, it was not related. This is in line with study conducted by Opy Diah Paramita regarding the Relationship of Asthma, Allergic Rhinitis and Atopic Dermatitis with Child-Specific IgE, it was found that from the results of examining child-specific IgE, there were only 14 out of 56 children who had house dust mite-trigger factors. In this study, there are also confounding factors, namely the criteria for a healthy house related to the density of house dust mite. The results of this study are not in line with previous study conducted by Denaneer Rahmadatu in 2019 entitled Relationship of Dermatophagoides spp. density, in this study there is a relationship between asthma attacks and house dust mite density where the respondents of the study were adult asthma sufferers who had a frequent asthma attack in the last three months during the study. In this study, the frequency of asthma attacks > 4 times / month was thought to be due to a lack of prevention of asthma attacks, so exposure to asthma triggers, as well as a lack of family support, can be minimized.

CONCLUSION
From the study that has been done, it can be concluded that there is a relationship between the healthy house category and the house dust mite density (p < 0.05) and there is no relationship between the asthma status in pediatric patients and the house dust mite density (p > 0.05).

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360


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