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THE RELATIONSHIP BETWEEN OCCUPANCY DENSITY, SOCIO-ECONOMIC, KNOWLEDGE AND BEHAVIOR WITH PEDICULOSIS CAPITIS PREVALENCE IN FEMALE STUDENTS AT AL-FATHANIYAH BOARDING SCHOOL SERANG CITY, BANTEN 2024

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ABSTRACT

Pediculosis capitis is a scalp disorder caused by pediculus ectoparasite infestation. The neglected handling of pediculosis capitis makes transmission very fast. There are many factors associated with the incidence of pediculosis capitis. The purpose of this study was to determine the prevalence and associated risk factors (occupancy density, socio-economic status, knowledge and behavior) with the incidence of pediculosis capitis in female students at Al-Fathaniyah Islamic Boarding School in Serang City, Banten. This research was conducted in March-April 2024 using observational analytical methods with a cross-sectional research design. The research subjects were 112 respondents who were selected using a simple random sampling technique in accordance with the inclusion criteria. Data collection was carried out using a validated questionnaire and direct sampling of head lice and then laboratory examination. Research analysis was carried out using the chi-square test and Fisher exact-test. There were 106 respondents 94,64%) positive for pediculosis capitis and 6 respondents (5,4%) negative for pediculosis capitis in female students of Pesantren Al-Fathaniyah Serang. There was a relationship between occupancy density (p value= 0,05), knowledge (p value= 0,008), behavior (p value= 0,005) with the incidence of pediculosis capitis and there was no statistically significant relationship between socio-economic with the incidence of pediculosis capitis (p value= 0,66). In conclusion, there was a relationship between occupancy density, knowledge, behavio with the incidence of pediculosis capitis and there was no statistically significant relationship between socio-economic with the incidence of pediculosis capitis

Keyword: *Pediculosis capitis, occupancy density, socio-economic, knowledge, behavior*

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INTRODUCTION

Pediculosis capitis is a scalp disorder caused by infestation with the ectoparasite Pediculus humanus capitis.[1] The management of pediculosis capitis is still neglected when compared to other diseases, which resulted in the rapid transmission of head lice, especially in densely populated areas.[2] In the United States, the population infested with head lice is 6-12 million annually, with children attending school being the target of infection. Based on case measurements in one school in Benghazi, Libya, the prevalence of head lice in school children was found to be 78.6%.[3] n addition, the incidence of head lice in school children in Argentina was 81.9%, Turkey 69.5%, Malaysia 35%, Thailand 23.48%, Indonesia 18.66%, India 16.59% and 8.9% in Belgium, which will continue to increase until it affects many countries in the world.[4,5] Head lice transmission can occur very quickly in densely populated environments where direct contact is easy, such as in schools and boarding schools. In Indonesia, the incidence of pediculosis capitis varies from region to region, with pediculosis capitis often occurring in schools and boarding schools. Based on epidemiological data, 74.6% of students in Jember, 73.1 students in Medan, 71.3% of students in Yogyakarta, 72.1% of students in Surakarta, 64.6% of students in Malang, 59.7% of elementary students in Badung, 59.2% of elementary students in Tangerang, 48.2% of students in Lampung, 35.3% of students in Palembang experienced pediculosis capitis. This is associated with densely populated environmental conditions that facilitate transmission through direct contact.[5–8]

The clinical manifestations of pediculosis capitis are itching of the scalp, excoriation, and occipital lymphedenopathy.[3] Itching of the head occurs due to sensitization to antigens derived from the feces and saliva of lice. In addition to causing physical symptoms, Pediculus humanus capitis infestation can cause sleep disturbances, anemia, decreased concentration, psychological stress (embarrassment, excessive anxiety, shunned from social circles), secondary infections due to abrasions from scratching the scalp.[2] Pediculus humanus capitis is also a vector for several disease agents, such as Yersinia pestis, Borrelia reccurentis, Bartonella quintana, Serratia wilt, Coxiella burnetii, Rickettsia aeschlimannii, Rickettsia prowazekii, and many others.[3] The risk factors for the incidence of pediculosis capitis include female gender, education level, frequency of hair washing, hair length and type, use of shared personal items, and use of shared beddinga.[5]

Epidemiologic data and further explanation of factors associated with the incidence of head lice in pesantren in Serang City, Banten are still very limited. Based on data from the Ministry of Religious Affairs as of 2022, it was found that Banten ranked second with the highest number of pesantrens, which is around 4,579 pesantrens[9], of which around 300 pesantrens are located in Serang

City.[10] Because of that reason, it is very important to conduct this study to determine the incidence rate and factors associated with the incidence of pediculosis capitis in Serang City, which includes residential density, socio-economic factors, behavior, and knowledge.

METHOD

This study used an observational analytic method with a cross-sectional research design. The study subjects consisted of 112 subjects selected using simple random sampling technique in accordance with the inclusion and exclusion criteria. Data collection was carried out using a valid, reliable and representative questionnaire which included a socio-economic status questionnaire, knowledge, behavior and occupancy density sheet. The collection of head lice specimens was carried out by combing directly with a serit comb on 112 respondents. Furthermore, the specimens were subjected to morphological examination at the FK Untirta Laboratory. The collected data were processed using SPSS 27.0, which included univariate analysis (measuring the percentage and frequency distribution of respondents' characteristics, incidence of head lice, residential density, knowledge and behavior) and bivariate analysis using the Fisher exact test to determine the relationship between the independent variables (residential density, socioeconomic status, knowledge and behavior) and the dependent variable (incidence of head lice). After data processing, the data is presented in tabular form to determine the incidence rate and factors associated with the incidence of pediculosis capitis. After that, a report will be prepared based on the data presented. This study uses individuals as respondents, so an ethical permit must be submitted to the Ethics Committee of the Faculty of Medicine and Health Sciences, Sultan Ageng Tirtayasa University. This research has been approved by the Ethics Committee with license number 17/UN43.20/KEPK/2024.

RESULTS

A. Overview of the Research Location and Description of Respondent Characteristics

The research was conducted at Al-Fathaniyah Islamic Boarding School in Serang, Banten which is located at Jl. Raya Pandeglang KM.03, Tembong Indah Housing Complex RT/RW 002/009, Tembong Village, Cipocok Jaya District, Serang City. This pesantren has a total of 35 teachers, 298 female students and 154 students who are currently studying at the MTs and MA levels. This research was conducted with a total of 115 respondents from March to April 2024. Of the total 115 respondents who had been selected using the simple random sampling technique, there were 3 respondents who had to be excluded because they fell into the exclusion criteria, such as 1 respondent using pediculoside agents in the last 7 days and 2 other respondents who did not fill out the questionnaire completely. Therefore, the total number of

respondents who were eligible for head lice specimen collection and univariate analysis and bivariate analysis was 112 respondents. The flow of description of the participation of research respondents can be seen in Figure 1 below:

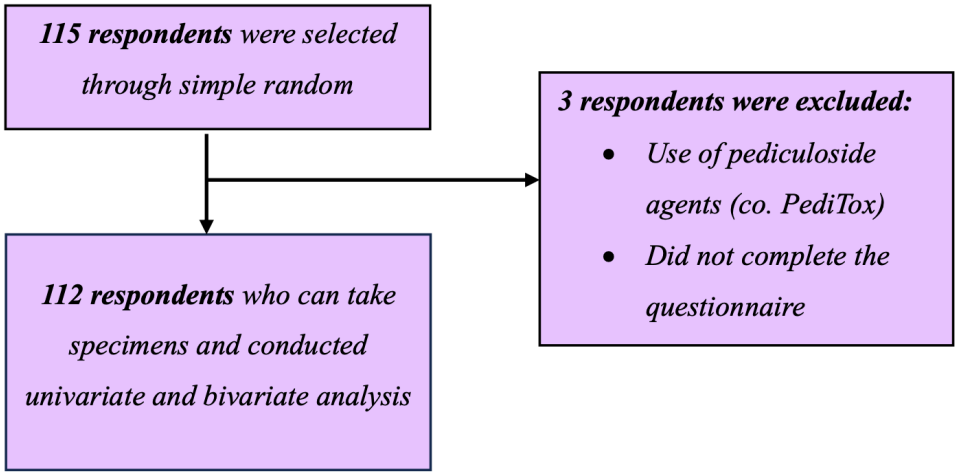

Figure 1. *Flow description of research respondents' participation*

The research respondents consisting of 112 subjects were female santri, aged 12-15 years, and were undergoing education in grades VII, VIII, and IX. Based on table 4.1, it is found that the average age of respondents is 13.5 years with as many as 50 respondents (44.6%) are in grade VII education level. The complete data can be seen in table 1 below:

Table 1. Characteristics of Respondents at Pesantren Al-Fathaniyah Serang, Banten

No	*Characteristics of Respondents*	*Mean ± SD**	*Frequency (N)*	*Percentage (%)*
	Age (year)	13,5 ± 0.9		
	Kelas			
1	Grade VII		50	44,6%
2	Grade VIII		27	24,1%
3	Grade IX		35	31,3%

* *Normal distribution of numerical data*

Source: SPSS 27.0

A. *Univariate Analysis*

Univariate analysis was carried out to see the distribution of variables or the proportion of each variable studied. Based on Table 2, it is known that in Pesantren Al-Fathaniyah there were 94.6% of respondents suffering from head lice, where 100% of the dwellings occupied by respondents were classified as dense dwellings. The socio-economic status of most respondents was in the middle class, namely 70.5%. 57.1% of respondents had insufficient knowledge related to pediculosis, and only 42.9% of respondents had good hygiene behavior. The complete data can be seen in table 2 below:

Table 2. Univariate Analysis of Pediculosis Capitis, Occupancy Density, Socio-economic Status, Behavior and Knowledge at Al-Fathaniyah Islamic Boarding School, Serang, Banten

Variable	**N = 112**	**%**
Incidence of Pediculosis Kapitis		
Pediculosis Kapitis Positive	106	94,6%
Pediculosis Capitis Negative	6	5,4%
Occupancy Density		
Dense	112	100,0%
Not dense	0	0,0%
Socio-Economic Status		
Lower	33	29,5%
Middle	79	70,5%
Knowledge Level		
Less/Sufficient	61	54,5%
Good	51	45,5%
Hygiene Behavior		
Less/Sufficient	64	57,1%
Good	48	42,9%

Source: SPSS 27.0

B. Bivariat Analysis

Bivariate analysis was used to observe the relationship between the independent variables and the dependent variable using the Fisher Exact Test, because the expected count value was >20% so the chi-square test could not be performed. Based on the results of Fisher's Exact Test analysis with a significant level of 5%, it was found that there was an association between residential density (p-value = 0.05), knowledge (p-value = 0.008) and behavior (p-value = 0.005) on the incidence of pediculosis capitis, and there was no association between socioeconomic status and the incidence of pediculosis capitis (p-value = 0.66). The complete data can be seen in table 3 below:

Table 3. Relationship between Occupancy Density, Socio-Economic Status, Knowledge and Behavior on Pediculosis Kapitis

	Pediculosis Capitis		*Total*		*p-Value*
	Positive	***Negative***	***N***	***%***	
Occupancy Density					
Dense	106	6	112	100%	0,05
Not dense	0	0	0	0%	
Socio-Economic Status					
Lower	32	1	33	29,5%	0,66
Middle	74	6	79	70,5%	
Knowledge Level					
Less/Sufficient	61	0	61	54,5%	0,008
Good	45	6	51	45,5%	
Hygiene Behavior					
Less/Sufficient	64	0	64	57,1%	0,005
Good	42	6	48	42,9%	
Total	**106**	**6**	**112**	**100%**	

Source: SPSS 27.0

DISCUSSION

Based on the results of the research that has been conducted, it shows that the incidence of pediculosis capitis is high among female students at the Al-Fathaniyah Islamic Boarding School in Serang, Banten, where 90 respondents (80.4%) are positive for pediculosis capitis and 22 respondents (19.6%) are negative for pediculosis capitis. Based on the classification of the National Pediculosis Association of the United States states that lice infestation of more than 5% can be defined as a

pediculosis endemic, so epidemiologically, the prevalence rate at Al-Fathaniyah Islamic Boarding School can be classified as high.[11] Based on the results of morphological examination in the laboratory, it was found that from the positive results of pediculosis capitis there were 1893 nits, 316 nymph stages, and 223 adult stages. This is in line with the life cycle of head lice, where adult female head lice can produce eggs with a range of 4 eggs / day, and around 16 days can produce 50-150 eggs. The eggs will be placed in an environment that has optimal temperature and humidity, such as behind the ear or around the neck line. Under conditions of >28oC and high humidity, nits can only survive up to 10 days. In about 1 week, the eggs will hatch into nymphs, and in about 9-12 days the nymphs will develop into adult lice. To live and reproduce, head lice must fulfill their nutritional needs by sucking blood from the human head every 3-4 hours. Head lice that are supplied with adequate nutrition can survive up to 1 month, while without an adequate environment and nutritional needs, head lice can only survive 1-2 days.[3]

In this study, it was found that 112 respondents (100%) lived in dormitories that had unqualified occupancy density with an average occupancy density of <4m2/person. A total of 106 out of 112 respondents were positive for pediculosis capitis, where there was a relationship between occupancy density and the incidence of pediculosis capitis (p-value = 0.05). Occupancy density that does not qualify can facilitate disease transmission due to the increasingly limited distance between individuals, the more the number of occupants in one room, the easier disease transmission will occur. In addition, dense occupancy will make the living space more humid, which is a favorable factor for the proliferation of head lice and increases the risk of head lice transmission.[12,13] The results of this study are in line with research conducted by Rahmita, et al at Pesantren Darul Hijrah Martapura, which stated that there was a significant relationship between occupancy density and the incidence of pediculosis capitis (p=0.002).[12] Another study conducted by Nadira WA, et al in Jember stated that residential density has a significant relationship with the incidence of pediculosis capitis (p<0.05), and individuals who are in dense occupancy are 3.35 times more at risk of developing pediculosis capitis (OR = 3.35).[13]

In this study, 79 respondents (70.5%) were at the middle socio-economic level, where there was no statistically significant relationship between socio-economic status and the incidence of pediculosis capitis (p-value = 0.66). This study is in line with research conducted by Rachman RE at SDN Karanganyar 2 Tangerang City which states that there is no relationship between socio-economic status and the incidence of pediculosis capitis (p = 1.000).[7] Other research conducted by Amelia L in Pondok Pesantren Tahfidzil Qur'an Yayasan Tijarotal Lan Tabur Palembang, found that there was no statistically significant relationship between father's education (p = 1.000), mother's education (p = 0.743), father's work (p = 0.314), mother's work (p = 1.000) and family income (p = 1.000) with the

incidence of pediculosis capitis. Head lice infestation is not limited to certain levels of education and poverty. Children who come from families with high economic levels can still experience head lice transmission if they come into contact with individuals who have head lice at school.[14] Head lice transmission can occur directly through direct head contact between individuals and indirectly through the use of shared items, such as pillows, headscarves, hats, combs, and so on. Children who are in a dense family environment have a higher risk of experiencing head lice infestation from their siblings or family, in addition, a dense family environment is also associated with a lack of attention to hair care. Poverty can be one of the risk factors for an increase in the incidence of head lice, which is associated with limited access to effective head lice management, low knowledge, poor personal hygiene, overcrowding, and others.[11,14,15]

In this study, 61 respondents (54.5%) had limited knowledge about pediculosis capitis, where there was a statistically significant relationship between knowledge and the incidence of pediculosis capitis (p-value = 0.008). The level of knowledge can be a way to minimize the incidence of pediculosis capitis. The level of knowledge is directly related to the level of education, where the higher the level of education, the better the level of knowledge. Good knowledge will establish healthy behaviors that can reduce the incidence of diseases, such as pediculosis capitis.[14,16] The results of this study are in line with research conducted by Rohmaniah S, et al at the Al-Manshur Popongan Islamic Boarding School, which states that there is a relationship between knowledge and the incidence of pediculosis capitis (p = 0.017).[16] Another study conducted by Amelia L, in Pondok Pesantren Tahfidzil Qur'an Yayasan Tijarotal Lan Tabur Palembang stated that the level of education (p<0.001) and knowledge (p = 0.035) was associated with the incidence of pediculosis capitis. Poor knowledge related to head lice infestation can increase the risk of experiencing pediculosis capitis.[14]

In this study, it was found that 64 respondents (57.1%) had insufficient hygiene behavior, where there was a statistically significant relationship between behavior and the incidence of pediculosis capitis (p-value = 0.005). The application of good knowledge and behavior can minimize the incidence of pediculosis capitis. The results of this study are in line with research conducted by Rachman RE at SDN Karanganyar 2 Tangerang City, which states that there is a relationship between behavior and the incidence of pediculosis capitis (p-value = 0.024), where poor health behavior is 11.2 times higher in the risk of being infested with pediculosis capitis than individuals who have good behavior (OR = 11.2 (1.36-91.82).[7] Another study conducted by Nadira WA, et al in Jember, stated that there was a relationship between personal hygiene (including hair hygiene, clothing hygiene, bed hygiene and comb hygiene) with the incidence of head lice (p value <0.005), where poor personal hygiene is 2.67 times higher risk of head lice infestation than individuals who have good personal hygiene. This is associated

with good hygiene behavior that can break the life cycle of head lice, which will reduce the incidence of pediculosis capitis.[13]

CONCLUSION

There was an association between occupancy density, knowledge and behavior with the incidence of pediculosis capitis, and there was no association between socioeconomic status and the incidence of pediculosis capitis. The prevention of pediculosis capitis must consider many factors to reduce the incidence of pediculosis capitis. The transmission of head lice can occur directly through direct head contact between individuals and indirectly through the use of shared items, such as pillows, headscarves, hats, combs, and other items

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