Epidemiology of Pediculosis Capitis of Foster Children in Orphanages Palembang, Indonesia

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Abstract - Pediculosis capitis is the most common ectoparasites which endemic globally in developed and developing countries that have tropical and subtropical climates. Head lice are obligate blood-sucking which has the potential to cause anaemia. Itching caused by flea saliva can cause children to have a sleeping problem, disrupt the concentration of learning, resulting in a decrease in achievement at school. The spread of pediculosis capitis is supported by the fact that this disease is more often diagnosed in children from dysfunctional families, orphanages and special schools that live in dormitories. This study aims to analyze the correlation between host factors, agents and the environment with the incidence of pediculosis capitis. This study was an analytical observational study with a cross-sectional design conducted in January 2019. There were 382 samples that had inclusion dan exclusion criteria. Data collected from anamnesis questionnaires and hair examinations of respondents.The result was analyzed using chi-square and logistic regression. There were 160 respondents (41,9%) had been found positive pediculosis capitis. The Statistical test showed that gender, personal hygiene, hair type, length of hair, knowledge, the habit of sharing the use of the comb, the habit of sharing the bed and the habit of sharing towel have a significant association to the incident of pediculosis capitis. The most dominant factor in the incidence of pediculosis capitis was personal hygiene. The children with poor personal hygiene had risk 8.713 times to get pediculosis capitis than children with good personal hygiene.

Keywords: Pediculosis Capitis, Orphanages, ectoparasites

1 INTRODUCTION

Pediculosis capitis is the most common ectoparasites occurring throughout the world. Most cases are found in children between 3 and 11 years. Infestations caused by hematophagous insects Pediculus humanus capitis or known as head lice (Valencia, et al., 2017).

The prevalence of pediculosis capitis is quite high in various countries. In Turkey, this pediculosis capitis outbreaks 69.5% of the population, while 6-12 million people suffer pediculosis capitis in the United States. Moreover, almost every year, 78.6% of inhabitants in Libya suffer from head lice. In developing countries like Malaysia, the prevalence is 35%, whereas in Indonesia estimated that 15% of school-age children experience this infestation. The average prevalence of pediculosis capitis in Asia is 15.1% ± 12.8%. In 2012 head lice infestation increased to 23.3% among schoolchildren in Bangkok. (Ruankham, et al., 2016).

Dirty hairs, moist, rarely combed and washed are the most preferred breeding ground by pediculus humanus capitis. These head lice easily transfer quickly from one individual to another, and it can be transmitted through direct contact or mutual borrowing of items such as combs, hats, and so on. (Karim *et al.*, 2016).

Head lice are potential bloodsucking obligates cause anaemia and itchiness. Itchiness can cause children difficult to sleep, disrupt the concentration of learning so that might affect on decreased

achievement in school. Moreover, Lesion Chronic fleas caused by tick bites can cause bacterial infection of the pathogen which will worsen the condition of the subject. (Yingklang *et al.*, 2018).

This infection most often affects children and adolescents, which is manifested by itching of the scalp and the appearance of inflammatory papules at the location of the biting lice within hours or days after infestation. Head lice infestation can cause cervical lymphadenopathy and conjunctivitis, as well as allergic reactions in the nasal cavity manifested by nasal obstruction and rhinorrhea. The spread of pediculosis is supported by the fact that this disease is more often diagnosed in children from dysfunctional families, orphanages and special schools who live in dormitories (Bartosik *et al.*, 2015).

Most cases of pediculosis capitis occur in school-age children with poor personal hygiene. Children residing in boarding schools and boarding schools are at high risk for the spread of capitis pediculosis (Ansyah et al., 2013).

In a study at the Kemuning sub-district orphanage in Palembang in 2015, it was found that the occurrence of pediculosis capitis in children was quite high at 62% (Fitria, 2015).

It is observed that the frequency of occurrence of pediculosis capitis is still high in orphanage and its impact on children such as reduced self-confidence, negative social stigma, lack of sleep quality, and learning disabilities, the authors are interested in analyzing the epidemiology of pediculosis capitis infection in foster children in orphanages in the city of Palembang.

2 MATERIALS AND METHODS

This study was an observational analytic study conducted with a cross-sectional design in January 2019. The population in this study were foster children living in Palembang orphanages, amounting to 2,596 children. The sample size was calculated using Snedecor & Cochran's (1956) cross-sectional design sample formula in (Ridgman, 1990) in a known population. There are 382 samples that have inclusion and exclusion criteria. The inclusion criteria were foster children aged ≤ 18 years who lived in orphanages and were willing to participate in the study with a written agreement signed by the foster parents. Exclusion criteria were foster children who were not present at the time of the study, foster children who were mentally impaired and foster children who could not be invited to communicate. The sampling technique in this study is proportional random sampling. Data was collected from questionnaire history & examination of respondent's hair. The results were analyzed using chi-square and logistic regression.

3 RESULTS

This examination was carried out by interviewing the respondent and observing the head to determine whether the respondent had pediculosis capitis or not. The foster children were observed by their head and combed their hair using a comb tightly, and lice were accommodated in a small lid with a pot. The results of the examination on 382 respondents obtained the proportion of pediculosis capitis incidence by 41.9%.

Table 1. Frequency Distribution of The Occurrence of Pediculosis Capitis

The Occurrence of Pediculosis Capitis	n	%
Negative	222	58.1
Positive	160	41.9
Total	**382**	**100**

Foster children who had been tested positive for pediculosis capitis as many as 160 people were assessed the number of lice found. After that, it was grouped into degrees of severity from mild, moderate to severe. From the analysis, it was found that the largest proportion was at a moderate degree of 45.6%. At this severity, the average number of lice obtained from the hair combing foster children ranges from 3-4 lice or 3-4 nymphs with or without eggs (nits).

Table 2. Distribution of Severity

Severity	n	%
Mild	48	30.0
Moderate	73	45.6
Heavy	39	24.4
Total	**160**	**100**

Age of foster children who were respondents in this study varied between 4 to 18 years, with the highest proportion at the age of 12-18 years at 61.30%. The majority of gender is female, 51% and the highest proportion of education is

uneducated children and children who are not finished elementary school.

Table 3. Distribution of Sociodemography

Sociodemography	n	%
Age (year)		
< 5	4	1.0
5 - 11	144	37.70
12-18	234	61.30
Sex		
Male	187	49.0
Female	195	51.0
Education		
Under Elementary School	193	50.5
Elementary School	109	28.5
Junior High School	61	16.0
Senior High School	19	5.0
Total	**382**	**100**

Sharing things together was habit of the foster children. From the questionnaire, it is found that most of the foster children have the habit of sharing the use of comb with the percentage of 66.5% of samples. It is followed by sharing the towels with the percentage of 11.3%. Nonetheless, the sharing bed is the major habit in which 96,1% of the foster children acknowledge that they share the bed.

Table 4. Head Lice Infestation According to Foster Childre in Orphanage Palembang

Variable	Pediculosis capitis				Total		*p*	OR 95% CI
	(-)		(+)					
	n	%	n	%	n	%		
Hair colour								
Other	1	20,0	4	80,0	5	100	0,166	0,176
Black	221	58,6	156	41,4	377	100		(0,020 -1,594)
Personal Hygiene								
Good	201	76,1	63	23,9	264	100	0,000	14,737
Poor	21	17,8	97	82,2	118	100		(8,502 - 25,546)
Knowledge								
Good	219	64,2	122	35,8	341	100	0,000	
Poor	3	7,3	38	92,7	41	100		
The habit of sharing the use of comb								
No	96	75	32	25	128	100	0,000	3,048
Yes	126	49,6	128	50,4	254	100		(1,905 -4,874)
The habit of sharing bed								
No	15	100	0	0	15	100	0,000	1,773
Yes	207	56,4	160	43,6	367	100		(1,620 - 1,940)
The habit of sharing towel								
No	216	63,7	123	36,3	339	100	0,000	10,829
Yes	6	14	37	86	43	100		(4,445 - 26,385)

Regression logistic test showed that children with curly/wavy hair type/types were 5.788 times riskier than children with straight hair types after being controlled with other variables in the modelling. Hair length, children who have hair length> 10 cm or over shoulder were 5.870 times more likely to develop pediculosis capitis than children with short hair <10 cm or above the shoulder. In term of personal hygiene, children with poor personal hygiene were more at risk of developing capitis pediculosis than children with good personal hygiene.

4 DISCUSSION

The results of research on foster children in orphanages in the city of Palembang showed the incidence of capitis pediculosis by 41.9%. Similar studies of capitis pediculosis by Amelia et al. (2018) at the Tahfidzil Qur'an Islamic boarding school in the Tijarotal Lan Tabur Foundation in Palembang, the number of pediculosis capitis among students was 48.7%. Research on students in the Aulia Cendikia boarding school in Palembang by Dita (2016) showed the proportion of capitis pediculus by 28.9%. Another Fitria (2015) at the orphanage in Kemuning sub-district of Palembang city, the incidence of capitis pediculosis in children was quite high at 62%. This shows that the incidence of capitis pediculosis in the city of Palembang is still quite high, especially in children who live in dormitories or orphanages. Other related studies in South Iran by Dehkordi et al. (2017), the prevalence of capitis pediculosis in primary school girls was 56.15%. In Mecca, the research of Assaedi *et al.* (2018) the prevalence of capitis pediculosis was 64.2%. Research by Saghafipour *et al.* (2017) in the Qom province of Iran, the prevalence of capitis pediculosis was 33.45%.

This shows that the global incidence of capitis pediculosis was still high in developed and developing countries. However, the occurrence of capitis pediculosis itself was often ignored and considered an issue that was not important to be solved. Though many effects of this infestation, besides making it difficult for children to concentrate on learning because of the itching caused, children who have pediculosis capitis become inferior and ashamed. Socially, they are more likely to withdraw. Another effect of their scalp becomes sores due to scratching and lice bites. Scarring on the scalp will prevent hair from growing, so the hair distribution in children becomes irregular.

In some studies, children with female have a higher proportion of pediculosis compared to men because most women have long hair making it a good place for head lice to breed. In addition, girls in social contact behaviour more closely with their fellow friends, have the habit of borrowing things to use together, such as hair accessories, veils, combs, and so forth. Girls also tend to have longer and more complicated than boys, so treatment is also more difficult than boys. Poorly maintained hair is a place favored by head lice for breeding. The orphanage children, where the lack of socio-economic conditions, sometimes do not have shampoo to wash their hair regularly. In addition, wet hair that is not dried causes the head to become moist and is a suitable means for lice to survive.

In epidemiology, hair characteristics are the host factor while head lice are the causative agent of the disease. Certain conditions of the hair support the development of head lice. Long hair, wavy and curly hair types are conditions favored by lice. Lice transmission occurs when hairs that have nail infestation are in close proximity to hair without nails or through items that have been contaminated with lice. Fleas breed through laying eggs attached to the patient's hair, on the long hair lice will be freer to attach the eggs so that the development of fleas so much more. It is similar to wavy or curly hair. This statement is consistent with the analysis of the results of the study which showed 92.7% of children with wavy/curly hair and 82.6% of children with long hair positively suffered from pediculosis capitis.

Personal hygiene is an essential factor in the transmission of capitis pediculosis. Poor personal hygiene is a significant factor that makes it easy for infections to enter the limbs both skin hair and other limbs on the body. The results of the analysis using the chi-square test value of p = 0,000 <0.05, it was concluded that personal hygiene is associated with the incidence of pediculosis capitis. From previous studies Ansyah et al. (2013) showed a relationship between personal hygiene with the occurrence of capitis pediculosis (p = 0.002). Children with poor personal hygiene have a better chance of experiencing pediculosis capitis than children with good personal hygiene. Personal hygiene behaviour is influenced by personal values

and habits adopted by individuals, in addition to cultural, social, family norms, education level, economic status and so forth. Problems with personal hygiene will have an impact on one's health condition. When someone is sick, one of the causes is lack of personal hygiene. Cleanliness is an important factor in maintaining one's health status (Ansyah et al., 2013).

Personal hygiene is very important in the entry of disease into the body. A person can get the disease through poor hygiene. Likewise, with the occurrence of pediculosis capitis, children who do not maintain cleanliness of their bodies and hair will be easily infected with head lice. Hair and scalp that is rarely washed with shampoo, bathing that does not use soap and clothes that are not replaced regularly is a risk of contracting pediculosis capitis.

Knowledge is the result of human sensing or the result of knowing someone about objects through their senses (eyes, nose, ears, and so forth). By itself at the time of sensing to produce knowledge is strongly influenced by the intensity of attention and perception of the object. Measurement of knowledge can be done by interview or questionnaire asking about the contents of the material to be measured from the research subject or respondent. Age and level of education, including factors that can affect a person's knowledge. The lower the level of a person's education, the more difficult it is to receive information and the less knowledge he has so that it will hamper the development of his attitude towards acceptance, information, and values that are newly introduced (Notoatmodjo, 2007).

The results of the analysis of the relationship of knowledge with the occurrence of capitis pediculosis in foster children in the orphanage in the city of Palembang showed a significant relationship with p = 0,000. In this study, it was seen those foster children with poor knowledge 92.7% experienced capiculic pediculosis showed that the importance of knowledge in reducing the prevalence of this event. Good knowledge can prevent children from contracting pediculosis capitis.

The spread of head lice can occur directly through hair-to-hair contact or indirectly through the use of shared items such as combs, clothes, hats, towels and other personal items. Children who are accustomed to using items such as combs, beds and towels alternately with other children have the opportunity to experience capitis pediculosis compared to children who use items personally or alone. Because head lice do not have wings and are often attached to items related to the head and hair, children who experience pediculosis capitis when using a comb, lice will be left on the comb so that when there are other children who use the same comb lice can move to the child's hair, similarly, the use of other hair accessories. When using a shared bed, head lice can stick to bed sheets or pillowcases and then walk into other children's hair so that the child also has head lice.

Head lice need to suck blood every three to four hours, and they can usually survive for only one day when not close to the scalp. They often dry out after a few hours. Eggs must also be close to the scalp because warm temperatures are needed so they can hatch into nymphs. For this reason, it is necessary to avoid direct contact with patients with pediculosis capitis, especially in terms of sharing or using personal items together.

5 CONCLUSION

The most dominant factor in the incidence of pediculosis capitis was personal hygiene. *It is demonstrated from the research that* children with poor personal hygiene had risk 8.713 times to get pediculosis capitis than children with good personal hygiene.

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