



The Prevalence of Pediculosis Capitis at Orphanages in Palembang City, South Sumatera (Indonesia)

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<p>Track Record Article</p> <p>Accepted: 30 March 2023 Revised: 08 April 2023 Published: 22 June 2023</p> <p>How to cite : Riswanda, J., Anwar, C., Zulkarnain, M., Sitorus, R. J., & Ghiffari, A. (2023). The Prevalence of Pediculosis Capitis at Orphanages in Palembang City, South Sumatera (Indonesia). <i>Contagion : Scientific Periodical of Public Health and Coastal Health</i>, 5(2), 612–625.</p>	<p style="text-align: center;">Abstract</p> <p><i>Pediculosis capitis is an endemic parasitosis affecting many countries of the world. A total of 5318 elementary schoolchildren, aged 8 –16 years, were examined for the presence of Pediculus capitis. The aim of this study was to investigate the incidence of head lice infestation in Palembang City. This research is a quantitative research with cross sectional research design. This research was conducted at the Palembang City Orphanage.. This research took place from July to September 2021. The research population was taken from orphanage children in 16 orphanages from 12 sub-districts in the city of Palembang as many as 3.823 peoples. The sample of this research is 300 people. The sampling technique in this study was by random sampling. Data collection using a questionnaire. Data analysis with chi-square test. The results of the research are the Prevalence of Pediculosis Capitis at Orphanages in Palembang City, South Sumatera (Indonesia) from 300 peoples found that the prevalence rate in urban areas (n=155) the highest number of sufferers was found in the Sako sub-district with 18 people (11.6%) and in rural areas (n=145) the number of sufferers was found in 2 research locations, namely in Indralaya 1 as many as 36 people (24.8%) and East Baturaja as many as 40 people (27.6%). Factors associated with Pediculosis Capitis at Orphanages in Palembang City, South Sumatra (Indonesia), namely such as children's health care (p-value=0.046), use of tools together p-value=0.004), children living with parents (p-value= ≤ 0.001), past infestation of fleas (p-value=0.027), lighting conditions of residential space (p-value=0.005) , teacher health education in schools (p-value=0.007), using general items (p-value=≤ 0.001), room conditions per student (p-value=0.028), and number of hairbrushes per day (p-value=0.016). Based on these results, it is suggested to the orphanage to provide socialization or health education as a preventive measure for Pediculosis capitis in order to increase knowledge and quality of personal hygiene in the orphanage by changing the attitude of each individual, especially children.</i></p> <p>Keywords: <i>Pediculosis capitis, Hair lice infestation</i></p>
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INTRODUCTION

Pediculosis is a worldwide public health problem. The head lice is the condition of infestation of lice, a type of exoparasite, *Pediculus humanus var. capitis* on the human scalp (Mayasin et al., 2017). It is commonly experienced by elementary school children. The prevalence of *Pediculosis capitis* indicates that children are of a fairly high age range in various countries around the world. Data on *Pediculosis capitis* in Indonesia said that 106 children (18,66%) of the 568 children known to have *Pediculosis capitis* (Rumampuk, 2017).

Pediculosis capitis is an infection of the scalp or hair in humans caused by *Pediculus humanus capitis*, often referred to as head lice. This disease primarily affects young children and spreads quickly in crowded environments, such as dormitories and orphanages. Pediculosis capitis usually affects the child population in the 6-12 year age group. Women have a 2-4 times greater risk of infection than men, especially in people who have long hair who live in rural areas (Kurnia Rahmawati et al., 2020).

The population of the orphanage is quite dense, so the risk of contracting pediculosis capitis is very high. An orphanage is a high-risk place for cohabitation in an orphanage with daily routines or activities such as eating together, sleeping together, playing together, bathing together is a risk factor for this disease. In addition, inadequate living facilities and poor hygiene factors for children will increase the risk of developing pediculosis capitis (Maryanti et al., 2020; Christy & Simanjuntak, 2023).

Transmission of pediculosis capitis occurs through hair contact with sufferers, either directly or indirectly. Indirect transmission can occur due to the habit of sharing items through combs, brushes, hair accessories, pillows, blankets, helmets, headscarves and passively facilitates new infestations (Anggraini et al., 2018). The use of items together will cause the adult eggs attached to these items to move to new sufferers (Nejati et al., 2018). The prevalence of pediculosis capitis at Subulussalam Palembang Islamic Boarding School is 35.3% with a mild degree of infection (Sari et al., 2022).

Head lice infestations are a significant public health issue worldwide, and spread quickly in unsanitary and overpopulated areas (Kassiri et al., 2016; Değerli et al., 2013). They are often related to poor communities in run-down conditions, and cause considerable health problems in many societies, particularly among children between 3 and 14 years of age (Değerli et al., 2013). This disease is caused by *Pediculus capitis* (Anoplura: Pediculidae), an ectoparasite detected on the hair and scalp (Nutanson et al., 2008; Mahmud et al., 2011), and is commonly transmitted through physical or direct contact (scalp-to-scalp) between children playing, or via indirect contact (brush, comb, clothing, towels, etc.) (Burgess, 1995; Vahabi et al., 2013).

Pediculus capitis does not appear to be a vector of any disease; however, the head louse can cause sleep loss, irritation, pruritus, discomfort, secondary bacterial infections (such as impetigo and acute glomerulonephritis), and lymphadenopathy in the lymph nodes on the back of the neck and ears (Doroodgar et al., 2014; Vahabi et al., 2012; Yousefi et al., 2012). Moreover, head lice infestations can occasional cause mental disorders, because children imagine that they are the result of being unclean (Oh et al., 2010). Several studies from various

regions in Palembang City have reported head lice infestation rates varying between 0.47% and 28.5% (Hodjati et al., 2008; Salemi et al., 2003).

In South Sumatra, until now there is no definite figure regarding the incidence of pediculosis capitis. In research at the Kemuning sub-district orphanage, Palembang city in 2015, it was found that the prevalence of pediculosis capitis in children was quite high, namely 62%, while research on students at the Aulia Cendikia Islamic boarding school Palembang in 2016 showed a prevalence of pediculus capitis of 28.9% (Tria et al., 2019). Based on research Norouzi et al., (2021) states that 12% and 15% of the causes of pediculosis capitis in children are caused by using the same hair comb, using the same pillow and sleeping in the same room.

Some investigations have been conducted at Orphanages in Palembang City province of South Sumatera (Indonesia) on the epidemiology of the head louse and its related risk factors. In these surveys, some of the factors suggested to have significant associations with the prevalence of head lice infestations included: parents' literacy, family size, school grade, and having a bathroom in the home in a Sirjan county study Yousefi et al., (2012), sex, father's occupation, mother's education level, having a bathroom in the house, previous history of disease, and nationality in Palembang City Doroodgar et al., (2014), geographical area (city or village), itching, student's age, prevalence of the disease in the family, and history of infestation Mohammadi-Azni (2013) school grade, family size, and type of house (Shayeghi et al., 2010); age of children, father's job, father's education, mother's education, using a common comb, and school grade (Vahabi et al., 2013); and children's age, use of hair oil, and presence or absence of dandruff (Salemi et al., 2003).

An orphanage is an example of a dense environment that supports pediculosis capitis. Living in a crowded environment makes foster children have the same personal hygiene as using shared combs or sleeping on the same mat. Poor sanitation in orphanages and cramped room spaces are also things that affect the cleanliness of each individual who lives in an orphanage, so it is necessary to know about sanitation in orphanages. The main objectives of the present study were to determine the prevalence of head lice at Orphanages in Palembang City province of South Sumatera (Indonesia) and to assess the risk factors related to infestation.

METHODS

This primary school-based, descriptive, cross sectional, analytical study. The research population was taken from orphanage children in 16 orphanages from 12 sub-districts in the city of Palembang as many as 3.823 peoples. The sample was taken using the Lemeshow formula (2014) and then the sample was taken by proportional random sampling from each of

the 12 districts in the Palembang city area as many as 300 peoples. This research took place from July to September 2021. The study was conducted among boys and girls between 7 - 12 years old in 16 primary schools. The information was collected in two parts, an interview and a health examination. Three-hundred grade 1 – 5 primary school pupils in both urban and rural regions of the county were examined for head lice infestations. Finally, a multistep, stratified cluster random sampling strategy was pursued to select the study cases.

The pupils' scalps and hair were inspected by three trained health care workers under the guidance of a medical entomologist. The diagnosis of a pediculosis capitis infestation was certified by visual examination of the hair and scalp (especially behind the ears and above the neck), using a hand magnifying glass, with the aid of a desk lamp for the detection of living lice, nymphs, and/or nits, for three-five minutes. Finding eggs represented an old infestation, while the detection of live lice showed an active infestation. These examinations were carried out after combing the hair of the children with a louse comb for approximately seven minutes over white paper. Any observed stage of lice was collected using adhesive tape. The standard questionnaire (with 26 closed-ended questions) recorded the following data: school grade, gender, age, number of family members, parents' jobs, parents' literacy, length of hair, type of hair (curly or straight), number of comb uses per day, the sharing of personal items, knowledge of head lice, hair density, past lice infestations, other family members with lice, presence of one of the life stages of lice, infestation severity, frequency of hair washing per week, bathroom at home, presence or absence of dandruff, birth rank, number of family members per bedroom, and presence of a school health educator. For the data analysis, a chi-square test (SPSS software, version 11.5) was used, and a P-value of less than 0.05 was considered to be significant.

RESULTS

In total, 300 primary school students from 16 orphanages, including 132 boys (44%) and 168 girls (56%), were screened for lice. Among these students, 145 and 155 lived in rural and urban regions, respectively. The overall head lice infestation rate in the studied population was 5.7% (n = 300), and Table 1 shows the prevalence. The lice infestations were stratified by the sociodemographic status of the parents, as well the geographical location, birth rank, age, gender, and school grade of the pupils.

Tabel 1. Prevalence of Head Lice Infestation in 16 sub-districts within the province of South Sumatra Indonesia

Location/ Sub District	Total	%
Urban Areas		
Palembang City		
Iilir Timur 1	10	6,4
Iilir Timur 2	12	7,7
Seberang Ulu 1	14	9,0
Seberang Ulu 2	10	6,4
Kemuning	13	8,4
Sako	18	11,6
Kalidoni	13	8,4
Iilir Barat 1	12	7,7
Iilir Barat 2	15	9,7
Alang-Alang Lebar	13	8,4
Sematang Borang	12	7,7
Sukarame	13	8,4
Rural Areas		
Ogan Iilir		
Indralaya 1	36	24,8
Indralaya 2	30	20,7
Baturaja		
Baturaja Timur	40	27,6
Sukaraja	39	26,9

Prevalence of Head Lice Infestation (table 1) in 16 sub-districts within the province of South Sumatra Indonesia in urban areas (n = 155) the highest number of sufferers was found in the Sako sub-district with 18 people (11.6%) and in rural areas (n = 145) the number of sufferers was found in 2 research locations, namely in Indralaya 1 as many as 36 people (24.8%) and East Baturaja as many as 40 people (27.6%).

Table 2. Prevalence of Head Lice Infestations in Relation to the Sociodemographic Status of the Parents, as Well Geographical Location, Birth Rank, Age, Sex, and School Grade of the Pupils

Variables	Infestations	Prevalence (%)	Total	%
Geographical location				
Urban areas	12	70,6	155	51,7
Rural areas	7	29,4	145	48,3
Gender				
Entire county				
Male	9	52,9	132	44,0
Female	8	47,1	168	56,0
Rural areas				
Male	2	40,0	60	20,0
Female	3	60,0	85	28,3
Urban areas				
Male	7	58,3	72	24,0
Female	5	41,7	83	27,3
School grade				
I	4	23,5	53	17,7
II	1	5,9	49	16,3

Variables	Infestations	Prevalence (%)	Total	%
III	5	29,4	63	21,0
IV	4	23,5	67	22,3
V	3	17,7	68	22,7
Mother's job				
Housewife	16	94,1	252	84,0
Employed	1	5,9	48	16,0
Father's job				
Government employee	2	11,8	84	28,0
Farmer	4	23,5	17	5,0
Laborer	2	11,8	69	23,0
Private	7	41,1	113	37,7
Unemployed	0	0	4	1,3
Others	2	11,8	13	4,3
Family size				
3	4	23,5	62	20,7
4	9	52,9	143	47,7
5	2	11,8	65	21,7
≥ 6	2	11,8	30	10,0

Prevalence of Head Lice Infestations in Relation to the Sociodemographic Status (table 2) found that the most cases were in urban areas as many as 155 people (51.7%), women as many as 168 people (56%), and 85 people (28.3%) in rural areas. the most school grades were in grade 5 as many as 68 people (22.7%), mothers jobs as housewives as many as 252 people (84%), fathers jobs as private employees as many as 113 people (37.7%) and family size (4 people) as many as 143 people (47.7%).

Table 3. Prevalence of Head Lice With Relation to Personal Hygiene

Variables	Infestations	Prevalence (%)	Total	%
Children's Health Care				
By themselves	2	11,8	10	3,0
By parents	15	88,2	290	96,7
Shared use of items				
Yes	17	100	205	68,3
No	0	0	95	31,7
Children living with parents				
Living with one parent	3	17,6	14	4,6
Living with both parents	12	70,6	283	94,3
Living with none of the parents	2	11,8	3	1,0
Infestation with lice in the past				
Yes	5	29,4	37	12,3
No	12	70,6	263	87,7
Sanitary bathroom at home				
Yes	12	70,6	252	84,0
No	5	29,4	48	16,0
Hair density				
High	6	35,3	162	54,0

Variables	Infestations	Prevalence (%)	Total	%
Low	11	64,7	138	46,0
Residential room lighting conditions				
Sufficient	16	94,1	289	96,3
Inadequate	1	5,9	11	3,6
Children's knowledge of pediculosis				
Yes	9	52,9	239	79,7
No	8	47,1	61	20,3
Number of hair washings per week				
Once a week	9	52,9	92	30,7
Twice a week or more	8	47,1	208	69,3
School health teacher				
Yes	0	0	87	29,0
No	17	100	213	71,0
Using common items				
Cap	2	11,8	29	9,6
Bed	5	29,4	47	15,0
Towel	3	17,6	100	33,3
Comb	5	29,4	83	27,7
Toothbrush	0	0	7	2,3
Headscarf	2	11,8	2	0,6
Underwear	0	0	22	7,3
Other items	0	0	10	3,3
Approximate spacing of students in the class				
More than 1.5 m ²	4	23,5	148	49,3
Less than 1.5 m ²	13	76,5	152	50,7
Hair length				
Long	12	70,6	192	64,0
Short	5	29,4	108	36,0
Number of hair brushings per day				
Once	8	47,0	93	31,0
Twice	5	29,4	122	40,7
Three times or more	2	11,8	78	26,0
Did not comb hair	2	11,8	7	2,3
Having dandruff				
Yes	1	5,9	31	10,3
No	16	94,1	269	89,7
Number of persons in bedroom				
One	0	0	6	2,0
Two	11	64,7	168	56,0
Three	4	23,5	67	22,3
Four	1	5,9	42	14,0
Five or more	1	5,9	17	5,6
Hair type				
Curly	4	23,5	42	14,0

Variables	Infestations	Prevalence (%)	Total	%
Straight	13	76,5	258	86,0
Bathing place				
Inside shower	14	82,4	258	86,0
Outdoor shower	3	17,6	42	14,0

The prevalence of head lice with relation to personal hygiene (table 3) found that there were 290 children's health care (96.7%), 205 people (68.3%) shared use of items, 283 children living with both parents (94.3%), no Infestation with lice in the past as many as 263 people (87.7%), Sanitary bathrooms at home as many as 252 people (84%), high hair density as many as 172 people (54%), Residential room sufficient lighting conditions 289 people (96.3%), Children's knowledge of pediculosis 239 people (79.7%), Twice a week or more hair washing per week 208 people (69.3%), no School health teacher 213 people (71%), Using common items by Towel as many as 100 people (33.3%). Approximate spacing of students in the class Less than 1.5 m² by 152 people (50.7%), Hair length by 192 people (64%), hair brushings three times by 122 people (40.7%), use dandruff by 269 people (89.7%), two persons in bedroom as many as 168 people (56%), Hair type straight as many as 258 people (86%), and Inside shower as many as 258 people (86%).

Table 4. Correlation Between Head Lice Infestations and Different Variables

Variables	df	x ²	P-Value
Gender (Entire County)	1	0.58	0.444
Geographical location	1	2.58	0.108
Gender in rural areas	1	0.46	0.495
Gender in urban areas	1	0.47	0.490
School grade	4	3.12	0.538
Age	5	3.62	0.605
Mother's job	1	1.37	0.241
Father's job	5	15.42	0.009
Family size	3	1.04	0.79
Mother's education	2	0.79	0.67
Father's education	2	1.54	0.46
Birth rank	5	1.35	0.929
Child's health care	1	3.97	0.046
Shared use of items	1	8.21	0.004
Children living with parents	2	28.46	≤ 0.001
Infestation with lice in the past	1	4.86	0.027
Sanitary bathroom at home	1	2.41	0.12
Hair density	1	2.53	0.11
Residential room lighting conditions	1	0.25	0.61
Children's knowledge of pediculosis	1	7.94	0.005
Number of hair washings per week	1	4.2	0.04
School health teacher	1	7.39	0.007
Using common items	7	56.03	≤ 0.001
Approximate space per student	1	4.80	0.028

Variables	df	χ^2	P-Value
Hair length	1	0.33	0.560
Number of hair brushings per day	3	10.33	0.016
Having dandruff	1	0.38	0.535
Number of people in bedroom	4	2.06	0.7
Hair type	1	1.40	0.491
Bathing place	1	0.19	0.655

The results of this study have shown that there are relationships between pediculosis and certain factors, such as children's health care (p-value=0.046), use of tools together p-value=0.004), children living with parents (p-value= \leq 0.001), past infestation of fleas (p-value=0.027), lighting conditions of residential space (p-value=0.005) , teacher health education in schools (p-value=0.007), using general items (p-value= \leq 0.001), room conditions per student (p-value=0.028), and number of hairbrushes per day (p-value=0.016).

DISCUSSION

In this study, the prevalence of head lice in primary school students at Orphanages in Palembang City province of South Sumatera (Indonesia) was found to be 5.7%. According to other studies in various areas of the world, especially in Africa and the Middle East, pediculosis capitis was a common condition among primary school students. The rates of lice infestation among school children in some countries have shown a wide range of differences, from 5 to 78% (Al-Shawa, 2006; Soleimani et al., 2007; Rassami et al., 2012) . The infrequent prevalence of infestation in this research could be related to the difficulty in scheduling countrywide screening in children, and individual-public educational hygiene programs concerned with early detection and the prevention of this disease. In five other research studies in Iran, in Sanandaj county (Vahabi et al., 2013), Paveh county (Vahabi et al., 2012), Ahvaz county (Rafie et al., 2009), Sirjan county (Yousefi et al., 2012), and Khajeh county (Shayeghi et al., 2012), the overall infestation rates were 4.7, 8, 11, 1.12, and 4.8%, respectively.

Our results showed that there was a greater prevalence of head lice infestations in boys than in girls, although this difference was not significant. It was presumed that gender-related behavioral dissimilarities affected the transmission rates, such as variations in hair styles, the use of hair products, and private grooming, as well as close contact and susceptibility. Girls commonly have longer hair requiring more frequent combing and grooming, and they also cover their hair with handkerchiefs during daily activities. Sometimes, however, they exchange these handkerchiefs with each other, which is a suitable vector for the transmission of lice.

In this research, the ratios of children with head lice infestations were dissimilar based on the age group, which may have been related to the behavioral differences in the various age groups. In addition, the infestation rates among the primary schools in both the urban and rural areas was not significant. Therefore, the differences in the head lice infestation rates may be based on the family income, economic status, overcrowded houses, degree of head to head contact, control methods, personal hygiene, primary school head lice strategy, parents' literacy, or situations in the health care system.

The findings suggested that there was a reduction in infestation rates in those students that had employed and educated mothers, which may have been due to the knowledge of pediculosis possessed by their educated mothers' social relationships. In addition, literate mothers may have a more positive attitude and knowledge with regard to hygiene. Overall, a higher level of the parents' education led to more suitable health behavior throughout the family, which is supported by other researchers (Bibi et al., 2011).

This investigation suggested that hair screening was significant in the prevention of lice. Direct contact, particularly head to head contact, was the main method of the transmission of head lice; therefore, it is an important factor in the dissemination and prevention of pediculosis. Moreover, a correlation was found between infested students and the use of common instruments. For example, the head lice infestation rate was greater in children sharing headscarves, hats, beds, pillows, sweaters, etc., which has also been shown in other studies (Muhammad Zayyid et al., 2010).

There was no significant difference between the type of hair and head lice, but some studies have suggested that hair type was an important factor in the head lice infestation rate. In Doroodgar et al.'s study (2014) in Aran-Bidgol county, a total of 88.2% of the cases had straight hair and 11.8% had curly hair, which was similar to the results of our survey. In the present study, nearly 70.6% of the cases had long hair, while Doroodgar et al.'s research (2014) showed that 64.7% of the cases had long hair. Overall, the absence of a significant difference between the prevalence rate of head lice and the length of hair is in line with other articles, although there is generally an imagined association between long hair and pediculosis capitis. In spite of the opinion of the school authority, cutting the hair does not reduce the incidence of head lice infestation (Salemi et al., 2003).

The pathobiology of dandruff is often correlated with *Pityrosporum ovale* (a fungus), which is incompatible with the nutrition and survival of lice. This study showed that those school students without dandruff were more infested than those with dandruff, which was in agreement with other articles (Salemi et al., 2003). Differences in the infestation rates between

the age categories (6 - 13 years-old) have been shown by many investigations. It seems as though the younger age groups are dependent on their parents for the cleaning, combing, and washing of their hair. This can contribute to the early discovery of head lice before a full blown infestation (Borges et al., 2002).

In this study, the family size was one of the agents contributing to the infestation rate, and in busy houses the pediculosis rate was the highest. Of note is the fact that once one family member is infested, the other family members have a high risk of infestation (Soleimani et al., 2007). Our study also described an association between access to a private bathroom and the head lice infestation rate. A private bathroom in a house plays a significant role in preventing pediculosis, as well as maintaining children's welfare and health (Khamaiseh, 2018). We found that school hygiene tutors play important roles in preventing head lice infestations in children, since they can raise the awareness of school student with regard to pediculosis.

Hygiene education with regard to pediculosis capitis and the methods of prevention for parents, teachers, and students is necessary. Furthermore, the consistent inspection of children's hair by trained health teachers is quite significant in the prevention of head lice infestations.

CONCLUSIONS

The Prevalence of Pediculosis Capitis at Orphanages in Palembang City, South Sumatera (Indonesia) from 300 peoples found that the prevalence rate in urban areas (n = 155) the highest number of sufferers was found in the Sako sub-district with 18 people (11.6%) and in rural areas (n = 145) the number of sufferers was found in 2 research locations, namely in Indralaya 1 as many as 36 people (24.8%) and East Baturaja as many as 40 people (27.6%).

Factors associated with Pediculosis Capitis at Orphanages in Palembang City, South Sumatra (Indonesia), namely such as children's health care (p-value=0.046), use of tools together p-value=0.004), children living with parents (p-value= \leq 0.001), past infestation of fleas (p-value=0.027), lighting conditions of residential space (p-value=0.005), teacher health education in schools (p-value=0.007), using general items (p-value= \leq 0.001), room conditions per student (p-value=0.028), and number of hairbrushes per day (p-value=0.016).

Based on these results, it is suggested to the orphanage to provide socialization or health education as a preventive measure for Pediculosis capitis in order to increase knowledge and quality of personal hygiene in the orphanage by changing the attitude of each individual, especially children.

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