JMU
Jurnal Medika Udayana
ISSN: 2597-8012 JURNAL MEDIKA UDAYANA, VOL. 14 NO.4, APRIL, 2025
Received: 2024-12-14 Revision: 2025-02-10 Accepted:01-03-2025

THE RELATIONSHIP OF RISK FACTORS WITH THE INCIDENT OF PEDICULOSIS CAPITIS IN CHILDREN OF SEKOLAH DASAR NEGERI 7 PEMECUTAN, DENPASAR CITY

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ABSTRACT

The incidence of pediculosis capitis is quite high throughout the world, so this disease has become a health problem in developed and developing countries, including Indonesia. This research uses analytical methods with a cross-sectional approach. Data was collected using a questionnaire and in conjunction with a head examination to determine if the subject was positive or negative for pediculosis capitis. The data collection technique used in this research was random sampling. Research data was analyzed bivariate using the chi-square statistical test and multivariate with binary logistic regression analysis. The prevalence of pediculosis capitis at SDN 7 Pemecutan was 48 out of 122 people (39.3%). Risk factors associated with the incidence of pediculosis capitis include gender (p<0.05), hair length (p<0.05), use of shared combs or accessories (p<0.05), and contact with people who are infested (p<0.05). Meanwhile, risk factors that are not related to the occurrence of pediculosis capitis infestation are age (p> 0.05), frequency of hair washing (p> 0.05), and use of shared beds or pillows (p> 0.05). The risk factor that most influence cases of pediculosis capitis is the use of combs and accessories together.

Keywords: Pediculosis capitis., prevalence., risk factors

INTRODUCTION

Pediculosis capitis is an ectoparasite infestation caused by *Pediculus humanus var. capitis*.[1] *Pediculus humanus var. capitis* is a type of hematophageal lie that was found 10,000 years ago and this is an ectoparasite commonly found in humans. The oldest *Pediculus humanus var. capitis* was found in 8000-year-old human hair at an archaeological site in Northeastern Brazil.[2]

Pediculus humanus var. capitis is an obligate parasite that sucks the blood of its host to survive.[3] *Pediculus humannus var. capitis* lives in human hair and scalp, usually occurs in young people, and can live up to 30 days but cannot survive more than 48 hours when not on the human scalp. One person can be contaminated with thousands of *Pediculus humanus var. capitis*. Head lice consume blood up to five times a day with a volume of <10 mL per consumption.[2]

The prevalence and incidence of pediculosis capitis are quite high throughout the world, so this disease has become a health problem in developed and developing countries. The infestation value of *Pediculus humanus var. capitis* overall in Thailand is 23.32%, and the invasion rate is smaller in boys (0%) than in girls (47.12%). The infestation rate among schoolchildren varies from 12.62% to 29.76%. Meanwhile, the ratio in the 12-year-old age group for girls varies from 26.07%, and in the 8-year-old age group, it increases to 55.89%.[4] The rate of pediculosis capitis in Asia is 15.1% ± 12.8%, 13.3% ± 17.0% in Europe, and 44.1% ± 28.0% in South America, while in developed countries such as Norway, it's in 97.3% of elementary school children.[5] Research in Ethiopia shows that women have an infestation rate 3.96 times higher than men.[6] The prevalence of pediculosis capitis was found (64.54%), 41 samples (57.7%) in Pondok Pesantren Sirojan Mustaqim and 30 samples (42.3%) in RW 03 Pondok Ranggon District, East Jakarta.[7] A prevalence of pediculosis capitis was found at 59.7% among students at SD No. 6 Darmasaba.[8]

Pediculosis capitis is often suffered by young children in the world, based on the latest information, more than 12 million young women, especially those aged 3-11 years, have suffered from pediculosis capitis infection. The highest dominance of around 59% is found in agricultural countries and tropical countries.[9]

Pediculosis capitis is an important problem because this disease can cause itching and insomnia caused by saliva and bites from lice which will cause a mild inflammatory reaction in the scalp area and can reduce the quality of life and productivity of the host. Pediculosis capitis sufferers are mostly found in school children who need sufficient rest time at night to study well during the day.[10]

Based on the problems above, this research was prepared with the aim of finding out the relation between pediculosis capitis incidence with risk factors in children through this research.

MATERIALS AND METHODS

This research was carried out at SDN 7 Pemecutan, Denpasar City. This research has received permission from the Ethics Committee of the Udayana Medical Faculty with reference number 767/UN14.2.2.VII.14/LT/2023. This article is a form of resume of the researcher's obligations from the preparation of the thesis that has been carried out previously. This research uses analytical methods with a cross-sectional approach. Data was collected using a questionnaire and in conjunction with a head examination to determine if the subject was positive or negative for pediculosis capitis. The data collection technique used in this research is random sampling. Research data was analyzed bivariate using the chi-square statistical test and multivariate with binary logistic regression analysis.

RESULTS

Based on the results of research carried out at SDN 7 Pemecutan on 29 April – 13 July 2023 using a random sampling method, results were obtained in the form of data on the incidence of pediculosis capitis as follows:

Table 1 Incidence of Pediculosis capitis at SDN 7 Pemecutan

Pediculosis capitis	n	%
Positive	48	39,3
Negative	74	60,7
Amount	122	100

Based on Table 1, the results of the head lice examination which was carried out with a total of 122 respondents from class I to class VI at SDN 7 Pemecutan, the results showed that the number of students who were positive for pediculosis capitis was 48 people with prevalence was 39.3% and 74 students were negative for pediculosis capitis with prevalence was 60.7%.

Figure 1 Image of *Pediculus humanus var. capitis* in the hair of research subjects

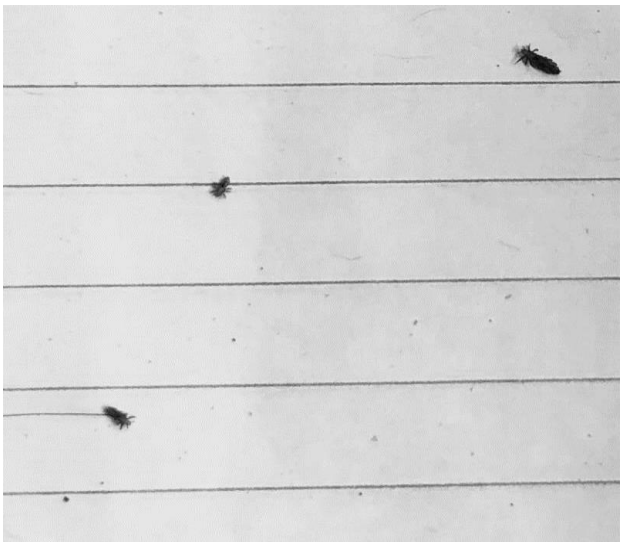

Figure 2 Image of *Pediculus humanus var. capitis* based on findings on research subjects

Table 2 Incidence of Pediculosis Capitis Based on Sociodemographic Data at SDN 7 Pemecutan

Sociodemographic Data	n	Examination Results	
		Positive n (%)	Negative n (%)
Gender			
Male	55	14 (11,5%)	41 (45,1%)
Female	67	34 (27,9%)	33 (27,0%)
Age			
6-9 years	80	33 (27,0%)	47 (38,5%)
10-13 years	42	15 (12,3%)	27 (22,1%)

Sociodemographic Data	n	Examination Results	
		Positive n (%)	Negative n (%)
Class			
I	29	11 (9,0%)	18 (14,8%)
II	21	10 (8,2%)	11 (9,0%)
III	19	9 (7,4%)	10 (8,2%)
IV	17	7 (5,7%)	10 (8,2%)
V	20	7 (5,7%)	13 (10,7%)
VI	16	4 (3,3%)	12 (9,8%)
Number of Siblings			
Don't have	8	3 (2,5%)	5 (4,1%)
1-2 people	66	24 (19,7%)	42 (34,4%)
3-4 people	35	17 (13,9%)	18 (14,8%)
>4 people	13	4 (3,3%)	9 (7,4%)
Number of Family Members			
≤4 people	55	22 (18,0%)	33 (27,0%)
>4 people	67	26 (21,3%)	41 (33,6%)
Mother's Education			
Not completed in primary school	5	2 (1,6%)	3 (2,5%)
Finished elementary school	10	6 (4,9%)	4 (3,3%)
Finished middle school	20	10 (8,2%)	10 (8,2%)
Finished high school	61	20 (16,4%)	41 (33,6%)
Academics/S1	26	10 (8,2%)	16 (13,1%)
Father's Education			
Not completed in primary school	3	1 (0,8%)	2 (1,6%)
Finished elementary school	13	8 (6,6%)	5 (4,1%)
Finished middle school	14	5 (4,1%)	9 (7,4%)
Finished high school	51	17 (13,9%)	34 (27,9%)
Academics/S1	41	17 (13,9%)	24 (19,7%)

Based on Table 2, the number of samples comprising of 55 boys and 67 girls appears that the frequency of pediculosis capitis is 11.5% in boys and lower than in girls 27.9% at SDN 7 Pemecutan. The incidence of pediculosis capitis in students aged 6–9 years was 33 (27.0%) and in students aged 9–13 years it was 15 (12.3%). The highest incidence of pediculosis capitis occurs in students who are in grade I, with a percentage of 9.0%. The highest incidence of pediculosis capitis was found in subjects who had 3–4 siblings, amounting to 13.9%. The highest incidence of pediculosis capitis occurred in subjects who had more than four family members, amounting to 21.3%. The highest number of incidences of pediculosis capitis occurred in subjects who had fathers with high school graduates and academic/bachelor degrees (13.9%). The highest number of incidences of pediculosis capitis occurred in subjects who had mothers with high school graduates (16.4%).

Table 3 Relationship between risk factors and the incidence of pediculosis capitis

Risk Factors	n	Pediculosis capitis		*p*
		Positive	Negative	
		n (%)	n (%)	
Gender				
Man	55	14 (11,5%)	41 (33,6%)	0,008
Woman	67	34 (27,9%)	33 (27,0%)	
Age				
6-9 Years	80	33 (27,0%)	47 (38,5%)	0,689
10-13 Years	42	15 (12,3%)	27 (22,1%)	
Hair Length				
Long	67	34 (27,9%)	33 (27,0%)	0,008

Risk Factors	n	Pediculosis capitis		*p*
		Positive	Negative	
		n (%)	n (%)	
Short	55	14 (11,5%)	41 (33,6%)	
Hair Washing Frequency				
1× a week	102	38 (31,1%)	64 (52,5%)	0,414
>1× a week	20	10 (8,2%)	10 (8,2%)	
Shared Comb/Accessory Use				
Yes	89	44 (36,1%)	45 (36,9%)	0,000
No	33	4 (3,3%)	29 (23,8%)	
Use of Shared Beds				
Yes	102	42 (34,4%)	6 (4,9%)	0,493
No	20	60 (49,2%)	14 (11,5%)	
Contact with Infested Persons				
Yes	87	40 (32,8%)	47 (38,5%)	0,031
No	35	8 (6,6%)	27 (22,1%)	

Based on Table 3, shows information regarding the number of subjects who suffered pediculosis capitis was 14 men and 34 women, and 41 men and 33 women who didn't suffer pediculosis capitis, and results were obtained (p<0.05). The number of subjects who suffered pediculosis capitis was 33 in the age range of 6–9 years and 15 in the age range of 10–13 years, and results were obtained (p>0.05). The number of subjects who suffered pediculosis capitis was 14 people with short hair and 34 people with long hair, and results were obtained (p<0.05). The number of subjects who suffered pediculosis capitis was 10 people who frequently washed their hair and 38 people who rarely washed their hair, and results were obtained (p>0.05). The number of subjects who suffered pediculosis capitis was 44 people who had and 4 people who had never used a comb or accessory together, and results were obtained (p<0.05). The number of subjects who suffered pediculosis capitis was 42 people who had and 60 people who had never been infested due to the risk of using a bed or pillow together, and results were obtained (p>0.05). The number of subjects who suffered pediculosis capitis was 40 people who had and 8 people who had never been infected due to contact with people who had pediculosis capitis, and results were obtained (p<0.05).

Table 4 Binary Logistic Regression Test

Variable	*p*	OR	95% CI	
			Lower	Upper
Gender	0,049	0,434	0,189	0,997
Hair length	0,049	0,434	0,189	0,997
Shared use of combs/accessories	0,002	6,330	1,997	20,068
Contact with infected people	0,076	2,393	0,913	6,271

DISCUSSION

The prevalence of pediculosis capitis was 39.3% at SDN 7 Pemecutan. These results are supported by research at SD No. 6 Darmasaba, with a prevalence of 59.7% of pediculosis capitis.[8] According to the results of research carried out at SD Negeri 11 Dauh Puri, it was found that there were 62 students with a prevalence of 43.1% of pediculosis capitis.[11] According to research at the PPAI An-Nahdliyah Islamic Boarding School, 31 respondents out of 48 with a prevalence of 64.6% suffered pediculosis capitis.[12] Research carried out at the Tahfidzil Qur'an Islamic Boarding School found that 57 students, with a prevalence of 48.7%, had suffered pediculosis capitis. [13] According to research in Southwest Iran, 1562 students suffered pediculosis capitis, with a prevalence of 26.3%. [14]

The prevalence of pediculosis capitis was 11.5% in boys and girls at 27.9%, and results were obtained (p=0.008) at SDN 7 Pemecutan. Research in Southwest Iran has shown that the incidence of pediculosis capitis was 15.2% in boys and 37.9% in girls. These results follow previous research, which has obtained results (p<0.05) regarding the relationship between gender and the incidence of pediculosis capitis..[8.15] This can happen because there are differences between boys and girls. After all, girls more often take turns wearing hair accessories such as hair ties, combs, headbands, and ribbons compared to boys, who only wear hats.[14,16]

The prevalence of pediculosis capitis was found in children aged 6–9 years (27.0%) and higher than in children aged 10–13 years (12.3%), and results were obtained (p=0.689) at SDN 7 Pemecutan. Based on research conducted in the Dinding Community at Bersehati Manado Market with 30 research subjects, the results showed that 24 children were positive for pediculosis capitis in the age

range of 5–11 years and 6 children in the age range of 12–16 years. [17] According to research conducted in elementary schools at Bangunharjo Sewon Bantul Yogyakarta region, pediculosis capitis is more common in children aged 8–9 years than children aged 5-7 years. The results of this study are bolstered by research carried out at SDN Pelesiran, which in its research appeared that there was no significant relationship between age and the incidence of pediculosis capitis (p=0.10).[18] The age that most often suffers from pediculosis capitis is 3–12 years old. This is because, at an age, they still needed their parents to comb, clean, and wash their hair.[19]

The prevalence of pediculosis capitis was 11.5% in children with short hair and was lower than in children with long hair, which was 27.9%, and comes about were gotten (p=0.008) at SDN 7 Pemecutan. These comes about take after past research (p<0.05) regarding the relationship between hair length and the incidence of pediculosis capitis. This happens because children who have long hair, especially girls, use objects such as combs and accessories together as their social activity.[12]

The prevalence of pediculosis capitis was 31.1% in children who washed their hair once a week and higher than in children who washed their hair more than once a week at 8.2%, and results were obtained (p=0.414) at SDN 7 Pemecutan. These results are following previous research, which obtained a value (p>0.05). These results prove that there is no significant relationship between the frequency of hair washing and the incidence of pediculosis capitis.[8] According to existing research, results have been obtained (p<0.05) regarding the relationship between the frequency of hair washing and the incidence of pediculosis capitis.[15] Personal hygiene is the most important thing in the occurrence of a disease in the body. Moreover, with the incidence of pediculosis capitis, children who rarely maintain healthy bodies and hair are more susceptible to contracting pediculosis capitis. Hair that is rarely washed using shampoo are risk factor for the incidence of Pediculosis capitis.[20]

The prevalence of pediculosis capitis was 36.1% in children who have used combs or hair accessories together and suffered pediculosis capitis was higher than children who never used combs or accessories together but were positive for pediculosis capitis 3.3%, which obtained a value (p=0.000). It appears that there's a significant relationship between the utilization of combs or accessories and the incidence of pediculosis capitis at SDN 7 Pemecutan. These results are following previous research, which obtained a value (p<0.05) regarding the relationship between sharing a comb and pediculosis capitis. This is caused by lice spreading their eggs, and sometimes adult lice that have been carried by combs or other accessories that are worn concurrently.[6,17]

The prevalence of pediculosis capitis was 34.4% in children who slept with other individuals who were positive for pediculosis capitis and in children who did not sleep with other individuals who were positive for pediculosis capitis was 49.2%, which gotten a esteem (p=0.493) which appeared there was no significant relationship between the utilization of beds or pillows together and the incidence of pediculosis capitis at SDN 7 Pemecutan. These comes about take after past investigate, wich gotten a esteem (p>0.05) that expressed that there was no significant relationship between the utilization of a shared bed and the incidence of pediculosis capitis.[17] This can happen because sharing a bed or pillow can facilitate the transmission of pediculosis capitis through continuous head contact if the person has a friend who suffers from pediculosis capitis.[15]

The prevalence of pediculosis capitis was 32.8% in children who had contact with infected people and were positive for pediculosis capitis it's higher than in children who had never contact with infected people but were positive for pediculosis capitis at 6.6%, and results were obtained (p=0.031) at SDN 7 Pemecutan. The results show that there is a significant relationship between contact with infected people and the incidence of pediculosis capitis. These results are supported by research carried out in Hulu Langat, Selangor, which obtained results (p<0.001). Close contact with each other over a long time causes a high incidence of pediculosis capitis. The main factor that causes high transmission of Pediculosis capitis can be through head-to-head contact, which is transmitted use of various tools that have been infested alternately, such as hats, combs, scarves, and pillows.[21]

Based on the results of the final multivariate analysis, it was found that the risk factor that most significantly influences the incidence of pediculosis capitis is the use of combs and accessories together. Combs and other accessories are objects that can act as a direct transmission site for Pediculosis capitis. This can happen because combs and accessories are very easy transmission media for *Pediculus humanus var. capitis* and its eggs to move from one host to another by attaching to these objects.

CONCLUSIONS AND SUGGESTIONS

The prevalence of pediculosis capitis in children at SDN 7 Pemecutan was 39.3%. Risk factors related to pediculosis capitis at SDN 7 Pemecutan, are gender, hair length, sharing combs and accessories, and contact with people with pediculosis capitis. The risk factor that most influences the incidence of pediculosis capitis at SDN 7 Pemecutan is the use of shared combs and accessories.

Hopefully, this article can provide readers with an understanding of the risk factors for pediculosis capitis.

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