



Current Prevalence Situation of Head Louse Infestation among Elementary School Kids in Taipei City

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Abstract

Background: Most published studies on head lice infestation in Taiwan have been focused their attention on eastern Taiwan or on some scattered rural areas elsewhere with the many residents being indigenous people, but not on urban areas.

Method: To get a better picture of the head lice infestation among school child in Taipei City, we did this from January 1 to December 31, 2006. If any pupil infested with head lice in elementary schools were diagnosed and notified, a team of trained nurses was sent to examine children of the whole class of the schools in the Taipei City. Those nurse to inspect the hair of all classmates of the notified case with their naked eyes to detect the presence of head lice or their eggs, and collected a structural

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questionnaire completed by all children examined.

Results: Of 6,036 school children examined, 151 (including the index cases) were found infected with head lice (a positive rate of 2.5% out of the examined). Should those 151 children be the only infected ones in the entire elementary school child population (178,494 according to the statistics published by Ministry of Education) in Taipei City in 2006, the prevalence of head lice infestation would be 0.085%. We also found that the mid-age class pupils (the 3rd graders and the 4th graders) suffered from infestations the most (77 pupils being found infested, or 51.1% of the total). We also found that 80 infested children attended schools in Wenshan District which had higher infestation number compared to the rest of other 11 districts of Taipei City. Further, the period from September to November of the year was found to have most infection cases. In a single risk factor analysis, we found that those with be female children, participating in tutoring classes elsewhere after school, sharing combs and washing-up tools with others, being less frequent in head washing, and having family members infested with head lice were likely to have infestation. The results of further multivariate logistic regression analysis showed that three of the above variables (being a girl [OR = 5.6, 95% CI = 1.5~20.7]; participating in tutoring activities [OR = 12.8, 95% CI = 3.8~42.8]; and having infected family members [OR = 20.6, 95% CI = 1.3~326.8), were still found to be significantly different.

Conclusion: The staff in the health authorities should pay more attention to the problem of school children getting infected with head lice through participating in tutoring activities in their future case monitoring.

Key words: head lice, elementary school kids, urban areas, partaking in tutoring activities.



Introduction

The lay public in Taiwan still believe that “head lice infestation” is an age-old communicable disease that takes place only in some remote rural areas with less than ideal sanitation environment and residents with substandard hygiene habits. The overall public health standard in Taiwan has greatly improved recently and is now almost on the level of the developed countries in the world. Therefore, the general public think that this particular disease does not exist in the modern urban communities in Taiwan. Although being infected with head lice seldom leads to serious complications or consequences the infested persons still suffer from some unpleasant experiences such as insomnia, itching, skin allergy, and scalp injury from over scratching, resulting in worsening the quality of life. We do occasionally run into cases of head lice infestation, and the victims are mainly primary school pupils even in urban areas [1-2]. The infection rate of young girls is normally higher than that of young boys [3].

Former studies and survey reports on head lice infestation done both here in Taiwan and abroad tended to stress on probing and discussing the medical therapy of the disease. For example, overseas epidemiologists in this research field liked to write about the medication effectiveness [1-3]. Kuo [4] reported that the overall current infection rate of this disease among elementary school children in Taiwan is around 1.0%. The government officials provide a small budget to all elementary school children in Taiwan to have an annual physical examination, and head louse infection is an item on the checklist. More particularly, Fan et al. [3, 5-9] carried out a study between July 1, 1997 and June 30, 1998, and found that they examined 2,725 students at 35 elementary schools in Sioulin

Township of Hualien County, Renai Township of Nantou County, Wulai Township of Taipei County, Jianshih Township of Hsinchu County, Fuhsing Township of Taoyuan County, and Nanao Township of Yilan County, and the average head louse infection rate among those pupils was found to be 12.8%. The staff at Hualien County Health Bureau made a survey in March 2000, on the prevalence of head louse infestation among all elementary and secondary school students and their family members within the county's boundary. They found that 2,640 students and their 8,616 family members had head lice infestation [10]. Another similar survey of head lice infestations was conducted among elementary school children to look for differences between mountainous and non-mountainous townships in Hualien County. Their finding showed that children of those mountainous schools were worse in head lice infestation than those of non-mountainous schools [11].

In the past, studies or surveys on head lice infestation among children in Taiwan were strictly focusing geographically on eastern region of Taiwan or on some scattered rural areas or townships elsewhere with most indigenous people residing. We could not find any literature mentioning survey made in Taipei City. In the past, head lice issues in Taipei City were dealt with by each municipal individual administrative district, and no integral surveys of all 12 districts throughout the city. Therefore, we did this city to get a complete picture of head lice infestation among school children in Taipei City.



Methods

I. Case identification

According to the 2006 official statistics published by Ministry of Education, Taipei City had 153 elementary schools (including 141 city public, 2 central government public, and 10 private ones). On January 1, 2005, an administrative reorganization for reporting school children's head lice infestation took effect at the city health. That is, the submitting route of the notification changed. The spotted cases have no longer been reported to the local district health unit. The new rule of report is submitted directly to the Department of Disease Control and Prevention, Taipei City Hospital. We collected those reported cases of head lice infestation submitted by all public and private elementary schools in Taipei City from January 1 to December 31, 2006.

II. Definition of the head louse infection case

The head lice infestation was defined by the school nurse or any other nurse dispatched to the site by Department of Disease Control and Prevention, Taipei City Hospital after they examined school children's hair by naked eyes and found head louse's bodies or eggs on the hair.

A procedure to confirm infestation was carried out from January 1 to July 31, 2006. During those seven months period, the nurse collected a cut segment of the hair with attached egg, larva, or adult and put it into an empty vial, stuck a name tag onto the vial, and sent the whole vial with a filled form to the Kunyang Laboratory of Taiwan CDC, where verification of the finding was done by trained eyes

through a microscope. But this extra procedure was abandoned from the standard procedure. Effective August 1, 2006, the field nurses to decided alone if the school child's hair was borne with head lice eggs or bodies without the need of sending the specimens to the laboratory.

III. The questionnaire

In this survey, we also distributed a structural type of questionnaire to gather information if the infested had living-in foreign domestic helper at home, had traveled recently to foreign lands, or shared combs or washing-up items with others, and if their family members were also infested with head lice.

IV. Data process and analysis

The completed copies of questionnaire were handed over to a designated person to sort the written answers out into digital data and keyed into an EXCEL file format. After the necessary preliminary file establishment and verification processes. The data were analyzed using SPSS edition 10.0 software (SPSS Inc., Chicago, USA).

Results

In 2006, Department of Disease Control and Prevention, Taipei City Hospital received 25 notifications of head lice infestation cases from schools, Consisting of 1 junior high school, 1 kindergarten, and 23 elementary schools. But 2 schools were notified repeatedly for 3 times, and another school 2 times. Therefore, 18 elementary schools were found having head louse infestations at least once in 2006.

After having been notified, we examined 6,036 school children (the original index cases plus their classmates), indentified 151 positive head



lice infestation cases, yielding a positive rate of 2.5% for the fraction of children being examined in this study. Since the total number of elementary school students in Taipei City in 2006 was reported to be 178,494, the prevalence of head louse infections among all elementary school children in the city was at least 0.085%. Of 153 elementary schools in Taipei City, 18 of them were reported to have pupils with head lice infestations in the year, so the prevalence of number of schools was 11.76%.

Table 1 show the findings of infested pupils with had lice from 12 municipal districts and various grades they attended at the time.

Table 1. Findings of infestation pupils with head lice from 12 elementary school children of various grades in each district of Taipei City

District	No of graders found infested						Subtotal (%)	No of pupils checked	Positive rate (%)
	1 st	2 nd	3 rd	4 th	5 th	6 th			
Taan	0	0	0	0	0	0	0(0.0)	0	-
Hsinyi	0	8	4	9	2	4	27(17.9)	528	5.11
Nankang	1	1	0	0	2	0	4(2.6)	75	5.33
Wanhua	1	0	4	1	1	2	9(6.0)	1,136	0.79
Tatung	0	0	0	0	0	0	0(0.0)	0	-
Shihlin	2	0	4	1	0	0	7(4.6)	276	2.54
Peitou	0	3	0	0	0	0	3(2.0)	41	7.32
Neihu	0	0	0	0	0	0	0(0.0)	0	-
Chungcheng	0	4	0	5	1	0	10(6.6)	189	5.29
Chungshan	0	0	1	0	0	0	1(0.7)	29	3.45
Sungshan	1	0	2	7	0	0	10(6.6)	3,000	0.33
Wenshan	3	11	6	33	21	6	80(53.0)	762	10.50
Subtotal	8	27	21	56	27	12	151(100)	6,036	2.50
Pupils checked	1,526	679	1,529	1,544	426	332			
Positive rate	0.52%	3.98%	1.37%	3.63%	6.34%	3.61%			

Figure 1 shows the monthly distribution of the reported head lice infestations of Taipei City elementary school pupils in 2006.

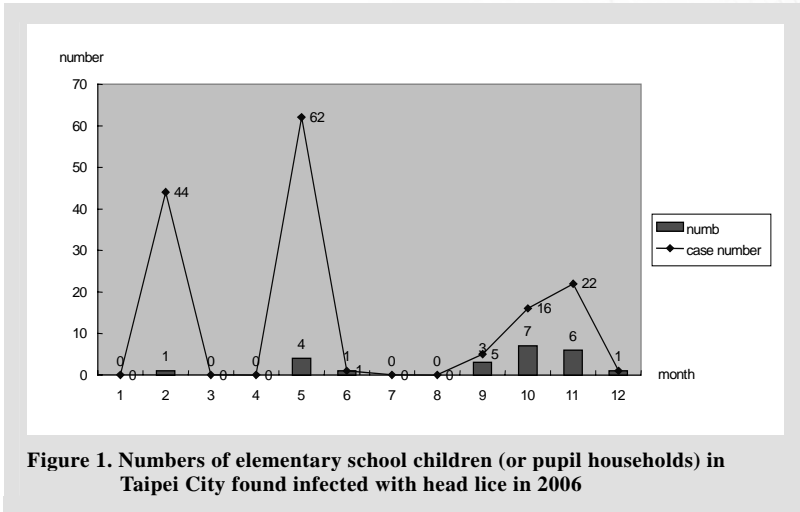


Figure 1. Numbers of elementary school children (or pupil households) in Taipei City found infected with head lice in 2006

Table 2 is a simple-item variable analysis of risk factors effecting head lice infestation among children in Wenshan District of Taipei City. The results showed that five variables (being female, participating in tutoring class, sharing combs and washing up tools, being more frequent in head washing, and family member of the student also having head lice) reached significant differences statistically (separate 95% confidence interval, or 95% CI, does not include 1.0). Table 3 shows those significant variables with statistic significance received further logistic multivariate regression analysis.



Table 2. A single-item-variable analysis of risk factors affecting head lice infestation among elementary school children in Wenshan District of Taipei City in 2006

Variable	Case set	Control set	OR	95%CI
Sex of the infested (n = 133)				
Female	53	30	10.85*	4.04~30.33
Male	7	43		
Participating in tutoring after school (n = 117)				
Yes	38	24	12.93*	4.43~39.7
No	6	49		
Having living in FDH at home (n = 132)				
Yes	3	2	1.90	0.25~16.94
No	56	71		
Having traveled abroad recently (n = 132)				
Yes	3	5	0.73	0.13~3.71
No	56	68		
Sharing combs and washing items with others (n = 131)				
Yes	33	25		
No	26	47	2.4*	1.1~5.2
Head washing frequency (n = 124)				
0~3 times/wk	30	23	2.26*	1.03~4.99
4~7 times/wk	26	45		
Family members also having head lice (n = 131)				
Yes	11	1	16.3*	2.1~348.1
No	48	71		

Remarks: OR denotes "Odds Ratio," 95%CI with a "95% Confidence Interval," and * means being significant statistically. 95%CI does not include 1.0.

Table 3. A multiple-item-variable analysis of risk factors affecting head lice infestation among children attending elementary schools in Wenshan District of Taipei City in 2006

Variable	OR	95% CI
Female (n = 133)	5.6*	1.5~20.7
Participating in tutoring (n = 117)	12.8*	3.8~42.8
Family member also having head lice (n = 131)	20.6*	1.3~326.8

Abbreviations: OR denotes odds ratio; 95%CI, 95% confidence interval

*Significant different

Note: 95% CI dose not include 1.0

Discussion

The 151 head lice infested school children discovered in this study were either detected by the school nurses and reported to Department of Disease Control and Prevention, Taipei City Hospital in the first place, or spotted later in the follow-up examination (Table 1). They were exposed and then notified in 2006. Therefore, an apparent prevalence of head lice infestation among elementary school children in Taipei City in 2006 was 0.085% out of a total population of 178,494. This prevalence figure is lower than those come up by some similar studies carried out in other countries (2). Because our estimation totally depended upon a self reporting system by the staff at the elementary schools, we believe that our figure may be lower than the factual one.

Based on Fig. 1, we found that most head lice infestation occurred from September to November. This finding may be that after the summer vacation was over and when the new school year had just started, many school nurses would carry out a school wide head lice infestation screening project to fulfill part of their duty for the new academic year.



Besides, we used to also hypothesize that the children might have got infested outside of Taiwan while traveling in foreign countries during the long summer vacation. Therefore we asked a question in the questionnaire to find if the kid had made trip overseas within three month previously. But based on all the returned completed forms, we found that only 8 school children traveled outside of Taiwan and that 3 of them were infested, whereas other 5 were not infested by head lice (Table 2). The numbers of those two groups were not significantly different.

As shown in Table1, 51.1% [(21 + 56)/151] of the infested school children were found to attend mi-age classes (the 3rd and the 4th grades), and the number of younger age class students (the 1st and the 2nd graders) constituted 23.1% [(8 + 27)/151], the smallest percentage of the total infestation pupils. These results are quite similar to those of other similar studies (8).

Wenshan District had the highest number of infested school pupils and number of schools having infested (Table 1). But this result could only reflect the fact that this school district had the most infested children detected and notified. We cannot conclude that Wenshan District had more head lice infested school children in 2006 than any other districts.

The investigators in other studies have also speculated that longer hair length of schoolgirls than that of school boys may cause the girls to have more chances to get infested (Reference??). As shown in Table 2, we had the same result. In Taipei City, school children are common to participate in various tutoring programs at other institutions or places after school. We noticed in this study that participating in tutoring activities stood out as an important risk factor affecting the odds (12.93) of getting

school children infested with head lice (Table 2). Therefore, we recommend that researchers of the health authorities should pay more attention to this issue on the head lice infestations in the future.

The results of this study had a great surprise in such a highly developed place as Taipei City to have head lice infestation. Base on these study findings, we found that many other old communicable diseases may have really never left and have stayed around among us only without us knowing about them. Hopefully, the results of this study will provide some useful references to the future head lice research program and the further development of more effective preventive measures.

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