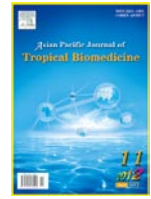




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Epidemiology of pediculosis capitis among schoolchildren in the eastern area of Bangkok, Thailand

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ABSTRACT

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Objective: To determine the prevalence of infestation with head lice in primary schoolchildren in the eastern area of Bangkok, Thailand. **Methods:** The present study was to determine the head lice infestation (Pediculosis) levels in primary schoolchildren, during May, 2011 to July, 2011. A total of 3747 schoolchildren aged 5–12 years old from 12 selected primary school of Ladkrabang district, the eastern area of Bangkok were examined for head lice. Pediculosis was defined as the presence of at least on living adult, nymph and viable egg. **Results:** The overall head lice infestation rate was 23.32% and infestation rate was higher in girls (47.12%) than in boys (0%). The infestation rate among schoolchildren varied from 12.62% to 29.76%. The infestation rate among girls varied from 26.07% (12 years old group) to 55.89% (8 years old group). **Conclusions:** Pediculosis is a common public health problem affecting primary schoolchildren in eastern area of Bangkok and those levels are epidemic importance.

1. Introduction

Head lice infestation also known as pediculosis capitis is the infestation of human hair and scalp cause by head louse (*Pediculus humanus capitis* De Geer)^[1,2]. Head lice are obligate blood-feeding human ectoparasites. They are connected to human hosts during all life stage and feed on only human blood, do not occur on pests or other animals and do not have wings and cannot jump^[1–6]. However, head lice are generally spread through direct transmission via head-to-head contact with an infected person is the major route or indirect transmission by sharing clothing, hairbrushes, hats, towels or other personal items of a person already. Head lice infestation is usually detected by three type of evidence; itching and inflammation of the scalp and neck, sighting of lice and

detection of eggs attached to hair shafts^[4–6].

The clinical symptoms, of head lice infestation are pruritus, lymphadenopathy, conjunctivitis, allergic reaction have been frequently seen more infested children and chronic heavy infestation among schoolchildren may lead to anemia^[1–7]. In addition, head lice infestation causes not only physical symptoms but also psychological stress because children believe that head lice infestation is a result of being dirty^[8]. However, head lice are a common infection in school-age children worldwide^[9,10]. In high-income countries, school-aged children aged 3–11 years are the most frequently affected despite therapeutic advances^[2]. Millions of cases occur annually and it has been estimated that children in the United States miss 12–24 million days of school per year because of head lice^[2,9,10]. Moreover, the increase in prevalence of head lice during the 1990s, research interest in human louse infestation is now greater than at any time since world war II^[11]. The high levels of lice infestations have also been reported from all over the world, varied from 1.6%–87%^[12]. However, The variation of infestation rate may be due to several factors including the eradication methods, number of

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head-to-head contacts, diagnostic techniques, school head lice policy (no-nit policy), pesticide resistance, and knowledge regarding head lice^[13,14].

In Thailand, head lice infestation was found to be the most common among primary schoolchildren. The prevalence of head lice infestation among primary schoolchildren in 1988 has also reported by Thavara *et al*^[15], the infestation rates were 57.7, 52.3, 44.1 and 36.6 in Northeastern, Southern, Central and Northern part of Thailand, respectively. In 2009, Thanyavanich *et al*^[16] have reported the high infestation rate of head lice among primary schoolchildren near the Thai–Myanmar border in Ratchaburi province, Thailand and infestation rate varied from 84.30% to 88.40%. For Chinese refugees residing in mountainous areas in Chiangrai province, Northern part of Thailand also reported by Fan *et al*^[17], the infestation rate was 52% in Akka girls and 19.7% in Han girls. According to the national pediculosis association of USA which defines head lice infestation rate more than 5% has been considered to be an epidemic^[14,18]. Therefore, the status of primary schoolchildren in Thailand is the epidemic condition. The objective of this study were to determine the prevalence of head lice infestation among primary schoolchildren from Ladkrabang district, Eastern area of Bangkok, Thailand.

2. Materials and methods

The total of 3799 primary school children (aged 5–12 years old) including 1901 girls, 1898 boys from 12 primary schools in Ladkrabang district, the eastern area of Bangkok, Thailand were examined for head lice during the period May 2011 to July 2011. All the studied schools were Thailand Government owned. The most of the studied girls had long hair and the boys had short hair. The examinations were conducted with the approval of the head teachers and in collaboration with school teachers. The entire head was examined carefully although special attention was paid to the nape of the head and behind the ears, for a period of 5 min. Head lice infestation (or Pediculosis) was defined as the presence of at least one living adult, nymph and viable nit (egg)^[19–25]. However, the viable nits were defined as nits which were within 1 cm. from the scalp and plump, shiny and tan to coffee colored with an intact operculum^[8]. Head lice were collected and transported to Entomology and Environmental Laboratory, Plant Production Technology Section, Faculty of Agricultural Technology Ladkrabang, Ladkrabang, Bangkok as previously reported by Rassami and Soonwera^[26]. After the examination the infested children were removed head lice using a plastic fine tooth comb and were treated with herbal oil and herbal shampoo (anti-head lice shampoo) from our Laboratory^[26]. The statistical analysis of results were performed using the chi-square test.

3. Results

Head lice infestation was observed in 3799 primary schoolchildren including 1898 boys and 1901 girls, 892 of them showed at least one living adult, nymph and viable nit. The overall infestation rate was 23.48%. The lowest was 12.62% in 12 years age group and highest was 30.13% in 8 years group, as shown in Table 1.

Table 1.

Prevalence of pediculosis capitis among primary school children (aged 5–12 years).

Age	No. examined	No. positive	%Pediculosis
5	247	65	26.32
6	273	67	24.54
7	674	180	26.70
8	551	166	30.13
9	429	99	23.08
10	568	135	23.77
11	431	101	23.43
12	626	79	12.62
Total	3799	892	23.48
<i>P</i> value			<0.001

The infestation rate among school varied from 18.81% to 29.75% (Table 2). Girls were high significantly infested than boys, with infestation rate of 46.92% and 0%, respectively as shown in Table 3. Overall boys (1,898) were not infestation rate The lowest of head lice infestation was 12 years age group and highest level was 8 years age group ($P < 0.001$) as shown in Table 4.

Table 2.

Prevalence of pediculosis capitis by school.

School	No. examined	No. positive	%Pediculosis
1	256	74	28.91
2	308	70	22.73
3	350	81	23.14
4	231	65	28.13
5	460	87	18.91
6	270	70	25.93
7	420	96	22.85
8	320	76	23.75
9	242	72	29.75
10	356	78	21.91
11	198	50	25.25
12	388	73	18.81
Total	3799	892	23.48

Table 3.

Prevalence of pediculosis capitis by sex.

Gender	No. examined	No. positive	%Pediculosis
Girls	1901	892	46.92
Boys	1898	0	0
Total	3799	892	23.48
<i>P</i> value			<0.0001

Table 4.

Severity of pediculosis capitis among girls.

Age	No. examined	No. positive	%Pediculosis
5	120	65	54.17
6	135	67	49.63
7	326	180	55.21
8	297	166	55.89
9	220	99	45.0
10	286	135	47.20
11	214	101	47.19
12	303	79	26.07
Total	1,901	892	46.92
P value			<0.001

4. Discussion

In our study was conducted among the 5–12 years old in 12 primary schools from Ladkrabang District, eastern area of Bangkok, Thailand. The 23.48% infestation rate found in this study shows the problem of head lice among schoolchildren especially in schoolgirls aged 5–12 years. The previous studies in Thailand by Thavara *et al*^[15], Thanyavanich *et al*^[16] and Fan *et al*^[17] have reported the high infestation rate among primary schoolchildren in both urban and rural areas varied from 36.6% to 88.4%. However, infestation rate among Thai primary schoolchildren is higher than 5%. According to the national pediculosis association of USA which defines an epidemic when infestation rate of more than 5%^[27,28]. Therefore, the status of primary schoolchildren (especially in schoolgirls) in Thailand is the epidemic importance.

Moreover, high level of lice infestation have also been reported from all over the world^[12]. The high level infestations were reported by Saddozai *et al*^[29] in primary schools of Quetta City, Pakistan with infestation rate of 87%, 59% in primary schools from the eastern Nepal^[30], 48.9% in primary school of Baghdad, Iraq^[31], 35% in primary schools of Kelantan, Malaysia^[32] and 29.7% in elementary schools of Buenos Aires, Argentina^[19]. However, lower infestation rate were reported by Oh *et al*^[8] in primary schools from urban and rural areas of Korea with infestation rate of 4.1%^[8], 1.6% in primary school from urban and rural areas of eastern Poland^[33], 3.3% in primary school from Bobigny, France^[34] and 1.6% in primary school of USA^[35]. In addition, the variation of infestation rate may be due to several factors such as the school head lice policy, eradication methods, number of head-to-head contact, personal hygiene, overcrowded dwellings, economic condition, family income, attitude of less concern about head lice infestation^[29,36]. Therefore, the prevalence of pediculosis decrease with increasing life standards i.e with high income, accessibility and consumption of water and better health care system^[33].

The higher prevalence of head lice in primary school children (aged 5–12 years old) than in other age groups is in accordance with other studies^[19,29]. Akhter *et al*^[37] found that the prevalence of pediculosis was higher in population of ≤15 years old group (22.15%) than that in population of 16–25 years old group (18.33%), 26–45 years old group (13.20%) and ≥45 years old group (10.0%). Also, school children tended to mix more with person of the same age and contact at a school or home were more intimate than at a work place^[13].

Age and sex affect head lice infestation, our study showed that girls were more infected with head lice (46.92%) than boys (0%). In girls the infestation rate varied from 26.07% to

55.89% with maximum infestation in 8 years old group. This is in accordance with 100% and 86.12% infestation levels found in 2004 and 2009 from school girls of Ratchaburi Province, Thailand^[16]. This tendency has also been reported many authors in different countries like India^[36], Pakistan^[27,38,39], Malaysia^[32], Iran^[27,40], Taiwan^[41], Venezuela^[42], Brazil^[43], Egypt^[44], Turkey^[45] and Greece^[28].

This has been attributed to gender-related behavioral differences, such as boys prefer playing outside only in brief contacts during sports or rough activities, while girls tend to play in small groups with closer contact (head-to-head contact) with each other^[44,46–48]. However, head-to-head contact is an important route of transmission as well as the passive transference like share hair accessories, brushes, hats, combs. In addition, hair length factor was found to be correlated with head lice infestation. The frequency of children infested was significantly lower when they had short hair and infestation rate was significantly higher in children with long hair^[29]. In our data, we found more than 40 times higher infestation rate in girls than in boys. However, the infestation rate also changed through the age groups of primary school. In some reports, it has been indicated that there is a decrease in the infestation rate with age^[29,37]. In our study, the schoolchildren aged 5–9 years showed a higher infestation rate (26.90%) when compared with schoolchildren aged 9–12 years (20.75%). Therefore, age of schoolchildren was affecting the infestation rate in our study with the same was also found to be correlating by Saddozai *et al*^[29], Ale *et al*^[39] and Akhter *et al*^[37]. This finding may be attributed to the possible more increasing close contact (head-to-head contact) between children aged 5–7 years old group than older children group. Finally, the infestation with head lice is a common public health problem affecting schoolchildren in Bangkok, Thailand. The infestation rate among Thai primary schoolchildren in Bangkok is higher than 5%, this is the epidemic condition of head lice in primary school in eastern area of Bangkok. In addition, the prevalence of pediculosis capitis decrease with increasing life standards, high income, better health care system. The suggestion for eradicate head lice, the parents and teachers should activated the schoolchildren regularly to wash their hair with anti-head lice shampoo or herbal shampoo, 3–4 times per week.

Conflict of interest statement

We declare that we have no conflict of interest

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