CASE REPORT

A CASE OF AURICULAR MYIASIS IN MALAYSIA

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Abstract. Many cases of myiasis have been reported in Malaysia. This is the second reported case of auricular myiasis caused by *Chrysomya bezziana*. The patient was a 41-year-old, mentally retarded, Orang Asli man. He was brought to the clinic by his mother with a complaint of pain and bleeding in his right ear for 3 days. On examination, blood and multiple maggots were seen packed in the external auditory canal of the right ear. A total of 39 live maggots were removed and maintained until they developed into 3rd instar larvae, which were later processed and identified as *Chrysomya bezziana*. The patient was discharged with amoxicillin 500 mg three times a day for 1 week.

INTRODUCTION

Myiasis can be defined as invasion of the organs and tissues of humans or vertebrate animals with dipterous larvae, which, for at least a certain period, feed upon living, necrotic, or dead tissues. Myiasis may be obligatory (it is essential for the fly larvae to live on a live host for at least a certain part of their lives) or facultative (the larvae are normally free-living, often attacking carcasses, but under certain condition they may infect living hosts). Examples of flies that cause obligatory myiasis are *Chrysomya bezziana* and *Cochliomyia hominivorax*; those which cause facultative myiasis include *Lucilia* spp and *Sarcophaga* spp. *Chrysomya bezziana* seems to cause more cases of myiasis in people in India and other parts of Asia than in Africa. When larvae invade natural orifices, such as the nose, mouth and eyes, it can be very severe, resulting in considerable damage, excruciating pain, and misery (Service, 1980).

Many cases of aural myiasis have been reported worldwide, caused by *Calliphora nociva* in an 18 month old boy in Australia (Morris and Weinstein, 1986), *Wohlfahrtia magnifica* in Egypt (Fawzy, 1991), in children in India (Singh *et al*, 1993), by *Sarcophaga haemorrhoidalis* in children in Israel (Braverman *et al*, 1994), in a 54-year-old farmer in Korea caused by *Lucilia sericata* (Cho *et al*, 1999), and in children with chronic otitis media in Turkey, caused by *Wohlfahrtia magnifica* (Yuca *et al*, 2005).

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In Malaysia, many cases of human myiasis have been reported. The first case was reported by Reid (1953) when he recovered *Chrysomya bezziana* from the big toe of a Malay man. Since then, many more cases of myiasis have been reported, which include intestinal myiasis (Cheong *et al*, 1973; Baharuddin *et al*, 1995; Lee *et al*, 1995), dermal myiasis (Thomas, 1980), urogenital myiasis caused by *Chrysomya bezziana* in a cancer patient (Ramalingam *et al*, 1980), urogenital myiasis caused by *Eristalis* spp (Lee, 1989), oral myiasis caused by *Chrysomya bezziana* in a paralysed patient (Lee and Cheong, 1985), nasopharyngeal myiasis caused by *Chrysomya bezziana* from an 80-year-old Malay woman (Lee *et al*, 2005), and two cases of oral myiasis in cerebral palsy patients (Roszalina and Rosalan, 2002).

Lee and Yong (1991) reported the first case of aural myiasis in a 10-year-old Indian girl, caused by *Chrysomya megacephala*. This was followed by another case of aural myiasis in a 41-year-old Malay woman caused by *Chrysomya bezziana* (Johari and Khanijow, 1993).

We are reporting the 3rd case of aural myiasis in Malaysia and the 2nd caused by *Chrysomya bezziana*.

CASE REPORT

The patient was a 41-year-old male, jobless, and mentally retarded Orang Asli (Aborigine) from Selangor. He was brought to the clinic by his mother with a complaint of pain and bleeding in his right ear for 3 days. On examination, a "moving mass" of multiple maggots was seen mixed with blood in the external right ear canal; they were removed with forceps. After removal, erosion of the external auditory canal with bleeding was seen, but the eardrum was not well visualized due to the bleeding. Examination

Fig 1- Maggots of *Chrysomya bezziana* recovered from the right ear of patient which were maintained in the laboratory to the 3rd instar larvae.

Fig 3- Third instar larva of *Chrysomya bezziana* showing the anterior spiracle with 7 lobes which is rare (normally 4-6 lobes).

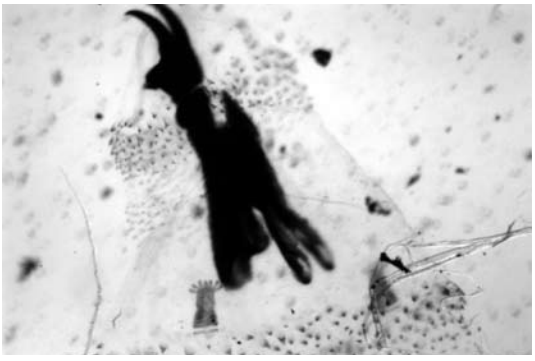

Fig 2- Cephalopharyngeal skeleton of 3rd instar larva of *Chrysomya bezziana*.

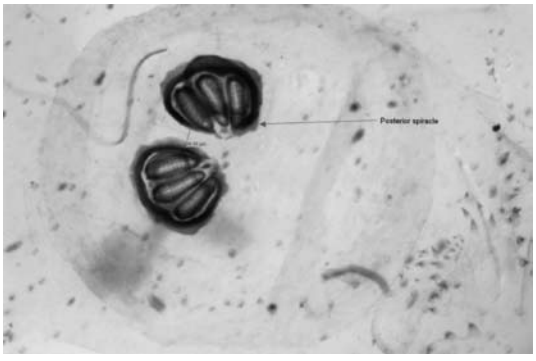

Fig 4- The posterior spiracles of third instar larva of *Chrysomya bezziana* which reveal the presence of three short and stout spiracular slits enclosed in a noncomplete peritreme.

found the left ear to be normal. The patient was discharged with amoxicillin 500 mg tds for one week. A total of 39 live maggots were extracted and sent to the Parasitology Laboratory, Faculty of Medicine, University of Malaya, for identification. The maggots were fed meat and maintained until they developed into 3rd instar larvae (Fig 1). The average body length of the 3rd instar larva was 15 mm.

The larvae were processed according to methods described by Zumpt (1965) and Smith (1973). Two larvae were picked and killed in hot water at 50-60ºC, then fixed in 70% alcohol for 10 minutes. Larvae were then cleared by soaking in 10% KOH solution overnight. While in the KOH solution, the specimens were punctured using a sharp needle. After rinsing in distilled water they were neutralized in 10% acetic acid for 30 minutes. The specimens were dehydrated in ascending series of ethanol and finally cleared using eugenol (clove oil) for 15 minutes. The specimens were then taken out and the oil removed with blotting paper. They were mounted on glass slides with euparal. After oven-drying at 60ºC for 2-3 days, the specimens were examined under a microscope. Larvae were identified by examining the anterior spiracles (Figs 2 and 3), posterior spiracles (Fig 4), and the cephalopharyngeal skeleton (Fig 2) using the keys by Zumpt (1965), which confirmed that these larvae were *Chrysomya bezziana*.

DISCUSSION

Chrysomya bezziana is an Old World screw-worm and is found throughout tropical Africa and most of Asia, ranging from India to the Philippines, Celebes, New Guinea and China, but is absent from Australia. Adults are 8-12 mm long, their colors ranging from metallic green, bluish-green, to almost purplish-blue. Adults are not normally attracted by decomposing organic matter but mainly by the discharge of wounds, on which the females readily feed. Males may occasionally be caught on flowers and cow dung (Zumpt, 1965). About 150-600 eggs are laid in wounds,

open sores, scabs, ulcers and on mucous membranes, especially those contaminated with discharges. The eggs hatch within 8-24 hours and newly emerged larvae burrow into the underlying tissues where they commonly remain congregated together. The larvae are obligatory parasites in wounds, and unlike all other *Chrysomya* spp, never develop in carcasses or other decomposing matter (Zumpt, 1965). Larvae tend to penetrate deeply into tissues, causing considerable destruction, often accompanied by putrid-smelling discharges and ulcerations. The larvae can reach the 3rd instar stage within as little as 2-3 days. After completing development in 5-6 days, they wriggle out of the wound and drop to the ground, where they bury themselves and pupate. The puparial period lasts about 7-10 days in warm weather. The life-cycle under ideal conditions is about 20 days. Control methods include mass rearing, sterilization by irradiation or by chemosterilants, and subsequent release of sterilized males to compete with fertile males of the wild population for mates. This has resulted in the reduction and virtual elimination of the screw-worm population from a project area in Texas. These measures were very successful for a number of years and were quoted as a classical example of genetic control for an insect pest, but setbacks to the program developed in 1972 due to screw-worm reinvasions from Mexico and the reduced vigor of laboratory-reared flies (Service, 1980).

All myiasis cases should be treated immediately, because their very rapid larval development can quickly cause permanent damage (Service, 1980). Treatment involves removal of maggots and debridement of tissue (Maguire and Spielman, 1998).

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PEDICULUS CAPITIS INFESTATION ACCORDING TO SEX AND SOCIAL FACTORS IN HAMEDAN, IRAN

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Abstract. *Pediculus capitis* or head-louse infestation has been a worldwide public-health problem, especially among school-aged children. To determine the intensity of infestation (abundance) among schoolchildren, children's sex and social factors were analyzed as modifiers of the general prevalence of parasitism. The study included 847 schoolchildren (407 girls, 440 boys) aged 6-12 years, from 12 public rural primary schools of Hamedan, Hamedan Province, Iran. Classic prevalence was obtained as the percentage of children with nits and/or lice. The general prevalence was 6.85% (girls: 13.5%; boys: 0.7%, $p<0.001$), head lice were much more common in girls than boys. The results showed significant variations in head lice infestation, and factors such as parents' literacy, type of hair, previous infestation, sharing of bed and comb, and care centers, while there was no significant variation between school grade, parents' job, members of family, and pediculosis in the studied areas ($p>0.05$). Sex and social factors are important modifiers of *P. capitis* general prevalence and degree of infestation. The classification of children by intensity of infestation allowed a more precise delimitation of this condition, which is especially important for disease surveillance and application of control measures.

INTRODUCTION

Pediculus capitis (Anoplura: Pediculidae) or head-louse infestation has been a worldwide public-health problem, especially among school-aged children, for a long time (Jinadu, 1985). The head louse is transmitted mainly through physical contact. Symptoms associated with infestation are constant itching and scalp irritation. When the ectoparasite is associated with poor social conditions and inadequate diet, the infestation may even lead to anemia (Linardi *et al*, 1988).

At the end of the '60s and beginning of the '70s, an important increase in pediculosis capitis prevalence was observed in many countries; lice infestation throughout the world was estimated to run into hundreds of millions (Ewasechko, 1981; Kwaku-Kpikpi, 1982; Courtiade *et al*, 1993), which may be found in people of all ages. However, school-aged children are more likely to be infested (Buxton, 1938; Lolió *et al*, 1975; Donaldson, 1976; Gbakima, 1992). Many factors related to the host can be associated with head-lice prevalence: race, age group, sex, socioeconomic conditions, and hair characteristics (Sinniah *et al*, 1981; Chunge, 1986). Overcrowded living conditions and resistance to insecticides have contributed to an increase in head lice in the last few years (Linardi *et al,* 1988; Pollack *et al*, 1999; Lee *et al*, 2000).

Findings by Ormeño (2004) indicate a need for a more precise approach to pediculosis intensity, so that children with different degrees of infestation should receive adequate care and vigilance. In the present study, the general prevalence of pediculosis was determined as well as a characterization of children according to different degrees (or mean abundance) of parasitism. Moreover, sex and social factors, proposed as risk factors, were analyzed.

MATERIALS AND METHODS

A total of 847 schoolchildren (407 girls and 440 boys) aged 6-12 years, in 12 public rural primary schools of Hamedan, Hamedan Province, Iran were enrolled into the study. Each school was visited only once, and children's names, sexes, ages and social factors were recorded from questionnaires. Physical examinations consisted of visual inspections of the children's heads for 3 minutes, paying special attention to the neck and behind the ears, with the help of hair manipulation. The time allocated was based on Mumcuoglu *et al* (2001), who showed that the average time for detection of the first (mobile) louse by direct visual examination was 116 seconds. Children whose hair had at least one developing stage (nymph or adult) *P. capitis*, or only nit residues, were

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considered positive. Based on the results obtained by Williams *et al* (2001), special attention was given to the number and position of the nits in relation to the scalp as indicators of parasitism intensity.

Statistical analysis

The results were analyzed statistically by chi-square test using SPSS software version 10; statistical significance was set at p-value < 0.05.

RESULTS

Of 847 children examined, 58 showed at least one sign of pediculosis (nits, mobile lice). This indicated a general prevalence of 6.85%, which was significantly higher in girls (13.5%) than boys (0.7%) ($p<0.0001$); 3/440 boys and 55/407 girls showed *P. capitis* (Table 1).

Table 1
Prevalence of head-lice infestation by sex and social factors[a].

	No. of examinations	No. of infestations	Prevalence (%)	χ^2- test
Sex				52.58[b]
Male	440	3	0.7	
Female	407	55	13.5	
School grade				6.75
1	56	11	19.6	
2	75	8	10.7	
3	90	15	16.7	
4	89	14	15.7	
5	97	7	7.2	
Type of hair				13.21[b]
Wavy	62	22	26.2	
Straight	290	33	10.2	
Parents' literacy				10.9[b]
Educated	203	18	8.1	
Uneducated	149	37	19.9	
Parents' job				0.58
Government	6	1	16.7	
Others	401	54	13.5	
Previous infestation				45.59[b]
Yes	44	28	38.9	
No	308	27	8.1	
Sharing of bed and comb				4.24[b]
Yes	243	46	15.9	
No	109	9	7.6	
Care centers				4.36[b]
Yes	189	16	7.8	
No	163	39	19.3	
Members of family				0.021
4	22	2	8.3	
>4	330	53	13.8	

[a]All analyses were performed for females, except the sex factor; [b]Significant by χ^2 test at 5% level.

The prevalence of head-lice infestation by school grade was 19.6, 10.7, 16.7, 15.7, and 7.2% for 1st, 2nd, 3rd, 4th, and 5th grades, respectively. No statistical difference was found between the 5 values ($\chi^2_{0.05}$ = 6.75).

Children with wavy hair had higher prevalence rates than other hair types ($\chi^2_{0.05}$ = 13.21). Increased prevalence was observed for children with uneducated parents ($\chi^2_{0.05}$ = 10.9), but parents' job was not associated with parasite distribution ($\chi^2_{0.05(2)}$ = 0.58).

Previous infestation and sharing of bed/comb also were important factors affecting the distribution of head lice ($\chi^2_{0.05}$ = 45.59; $\chi^2_{0.05}$ = 4.24). Head-lice distribution comparing care centers showed significant differences ($\chi^2_{0.05}$ = 4.36). The results of the χ^2-test showed insignificant differences between head lice prevalence rate and family members ($\chi^2_{0.05}$ = 0.021).

DISCUSSION

Studies on head lice among populations of different socioeconomic levels have encountered significant differences between prevalence rates in different populations and regions (Lolió *et al*, 1975; Ewasechko, 1981; Kwaku-Kpikpi, 1982). In the current study (Table 1), analysis indicated a lower prevalence rate in boys than girls, which may be due to earlier and easier diagnosis and control of head lice in short-haired children. The predominance of long hair among females was a factor associated with the higher prevalence of pediculosis in this group (Sinniah *et al*, 1981; Linardi *et al*, 1989; Mumcuoglu *et al*, 1990). Therefore, a higher prevalence rate was found among girls according to the hair volume. The fact that children with straight hair had a lower prevalence than wavy hair seems to conflict with the results obtained for the factor "hair shape". Girls generally have longer hair than boys and longer hair requires better grooming and combing. Childen's sharing beds and combs is strongly associated with pediculosis.

The prevalence of head-lice infestation among children with educated parents was lower than for those with uneducated parents, which suggested that literacy level was an important factor in the prevalence of infection.

Teaching the community about personal hygiene and the availability of anti-pediculosis drugs could lead to reduction in the prevalence of pediculosis capitis among children. Educational campaigns by community nurses, public health doctors, and teachers, are expected to be helpful for head-lice control. It is essential that school authorities and care centers cooperate successfully to control head louse infestation in primary schools. Also, care-center teams should be responsible for treatment and prevention of louse infestation besides performing other care-center services.

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