

Prevalence of pediculosis capitis and determination of risk factors in primary-school children in Kerman

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انتشار قُمال الرأس وتحديد بعض عوامل اختطاره لدى أطفال المدارس الابتدائية في كerman عام 2003
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الخلاصة: أُجريت هذه الدراسة الوصفية التحليلية بغرض تحديد معدل انتشار الإصابة بقمل الرأس، وبعض عوامل اختطاره لدى تلاميذ المدارس الابتدائية في كerman. وقد قامت الباحثتان باختيار 1200 تلميذاً وتلميذة (53% منهم من الإناث)، وذلك من بين تلاميذ خمسين مدرسة ابتدائية، باتّباع أسلوب العيّنة العشوائية التصنيفية المتعدّدة المراحل. وتم فحص الشعر للكشف عن الإصابة بالعدوى بالطفيليات، وتبيّن أن 45 من المشاركين في البحث (3.8%) كانت لديهم عدوى بقمل الرأس، منهم 43 (95.5%) من الإناث، و2 (4.5%) من الذكور. وكان أعلى معدل إصابة بالعدوى بالطفيليات موجوداً لدى الأطفال في سن التاسعة. وكانت هناك علاقة واضحة بين الإصابة بعدوى طفيليات القمل، وبين الجنس (P أقل من 0.0001)، والعمر (P أقل من 0.05)، والمستوى التعليمي للآباء (P أقل من 0.0001)، ووظيفة الأب (P أقل من 0.01)، وحجم الأسرة (P أقل من 0.01)، وطول الشعر (P أقل من 0.0001)، وتوافر مرافق استحمام منفصلة بالمنزل (P أقل من 0.0001).

ABSTRACT This descriptive, analytical study was carried out in 2003 to determine the prevalence of pediculosis capitis and some risk factors among primary-school pupils in Kerman. We selected 1200 pupils (53% girls) from 50 primary schools by multistage, systematic random sampling. Their hair was examined for head louse infestation: 45 (3.8%) were infected with lice, 43 (95.5%) girls and 2 (4.5%) boys. The highest rate of infestation was in 9-year-olds. There was a significant relationship between head louse infestation and sex ($P < 0.0001$), age ($P < 0.05$), parents' education ($P < 0.0001$), father's job ($P < 0.01$), family size ($P < 0.01$), length of hair ($P < 0.0001$) and having separate bathing facilities in the house ($P < 0.0001$).

Prévalence de la pédiculose de la tête et détermination des facteurs de risque chez des écoliers du primaire à Kerman

RÉSUMÉ Cette étude analytique et descriptive a été réalisée en 2003 pour déterminer la prévalence de la pédiculose de la tête et certains facteurs de risque chez des écoliers du primaire à Kerman. Nous avons sélectionné 1200 élèves (53 % de filles) dans 50 écoles primaires par échantillonnage aléatoire systématique à plusieurs degrés. Leurs cheveux ont été examinés à la recherche d'une infestation par des poux de tête : 45 (3,8 %) étaient infestés par des poux – 43 filles (95,5 %) et 2 garçons (4,5 %). Le taux d'infestation le plus élevé se trouvait chez les enfants âgés de 9 ans. Il y avait une relation significative entre l'infestation par les poux de tête et le sexe ($p < 0,0001$), l'âge ($p < 0,05$), le niveau d'instruction des parents ($p < 0,0001$), l'emploi du père ($p < 0,01$), la taille de la famille ($p < 0,01$), la longueur des cheveux ($p < 0,0001$) et le fait d'avoir des salles d'eau séparées dans la maison ($p < 0,0001$).

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Received: 11/12/03; accepted: 15/08/04

Introduction

Skin disorders are among the most frequently diagnosed conditions in schoolchildren in both developing and industrialized countries [1–5]. The school environment makes children vulnerable to cross-transmission of communicable skin diseases, which can then be passed on to family members [6]. Head louse infestation is a condition that has worldwide distribution and is seen in school-age children in many countries.

This study was carried out to determine the prevalence of pediculosis capitis and some of the factors affecting infestation among pupils in primary schools in Kerman city.

Methods

The present study was a descriptive, cross-sectional, analytical study. The study sample was selected from the students of 50 primary schools in Kerman city in the Islamic Republic of Iran, 1076 km south-east of Tehran. The sample size was 1200 students, using the formula

$$N = z^2pq/d^2$$

where $p = 0.08$ (from previous Iranian studies), $q = (1 - p)$ and $d = 0.016$. For 95% confidence ($\alpha = 0.05$) N is 1104. Considering attrition of 9%, N was calculated at 1200. In this study 50 primary schools were selected by classification cluster random sampling. First, all the primary schools in Kerman city were divided into 3 groups according to size:

- Group A: 62 schools (32 boys' schools, 30 girls' schools) having < 150 students
- Group B: 75 schools (34 boys' schools, 41 girls' schools) having 150–300 students

- Group C: 55 schools (32 boys' schools, 23 girls' schools) having > 300 students

Then, taking into consideration the population of each group, the number of samples from each group was determined and schools were chosen by random cluster sampling. From the first group, 144 students were selected from 10 schools, from the second group 420 students from 20 schools and from the third group 636 students from 20 schools (in total, 24 boy's schools and 26 girl's schools were sampled). In each cluster according to the population of the school, the number of students in the sample was determined and students were selected using simple random sampling at all levels.

At the beginning of the survey, parents were invited to the school by the principal. They were informed about the study and asked for consent for their children to participate. All agreed to give consent. The survey was carried out from 6 April to 2 June 2003.

For data collection, the students' hair was examined carefully by one of the authors. The presence of nits, nymphs or adult lice in the hair were the criteria for diagnosis of head louse infestation. The data from this physical examination were recorded for each pupil along with the demographic information that was collected from the students or from school documentation.

Analysis of the data was performed using SPSS.

Results

A total of 1200 primary-school students were examined for this study, 636 girls (53%) and 564 boys (47%). Demographic data and prevalence of infestation are shown in Table 1. Only 30 students (2.5%) were living in families with family size > 10 and only 94 (7.8%) were living in a house

Table 1 Prevalence of head louse infestation in pupils of primary schools in Kerman city, 2002–03

| Variable | No. | % | Prevalence of infestation | | P-value |
|--|------|------|---------------------------|------|----------|
| | | | No. | (%) | |
| <i>Sex</i> | | | | | < 0.0001 |
| Female | 636 | 53.0 | 43 | 6.8 | |
| Male | 564 | 47.0 | 2 | 0.4 | |
| <i>Age (years)</i> | | | | | < 0.05 |
| 7 | 195 | 16.3 | 7 | 3.6 | |
| 8 | 223 | 18.6 | 4 | 1.8 | |
| 9 | 213 | 17.8 | 14 | 6.6 | |
| 10 | 224 | 18.7 | 2 | 0.9 | |
| 11 | 259 | 21.6 | 13 | 5.0 | |
| > 11 | 86 | 7.2 | 5 | 5.8 | |
| <i>Hair length</i> | | | | | < 0.0001 |
| Short ^a | 738 | 61.5 | 9 | 1.2 | |
| Long | 462 | 38.5 | 36 | 7.8 | |
| <i>Family size</i> | | | | | < 0.01 |
| < 5 | 690 | 57.5 | 18 | 2.6 | |
| 5–10 | 480 | 40.0 | 23 | 4.8 | |
| > 10 | 30 | 2.5 | 4 | 13.3 | |
| <i>Mother's education^b</i> | | | | | < 0.0001 |
| Illiterate | 126 | 10.5 | 9 | 7.1 | |
| Primary | 345 | 28.8 | 23 | 6.7 | |
| Secondary to diploma | 573 | 47.8 | 9 | 1.6 | |
| University education | 106 | 8.8 | 0 | – | |
| <i>Father's education^c</i> | | | | | |
| Illiterate | 105 | 8.8 | 12 | 11.4 | |
| Primary | 324 | 27.0 | 14 | 4.3 | |
| Primary to diploma | 540 | 45.0 | 16 | 3.0 | |
| University education | 165 | 13.8 | 0 | – | |
| <i>Father's job</i> | | | | | < 0.01 |
| Skilled | 346 | 28.8 | 8 | 2.3 | |
| Semi-skilled | 314 | 26.2 | 21 | 6.7 | |
| Unskilled | 467 | 38.9 | 14 | 3.0 | |
| Unemployed | 26 | 2.2 | 1 | 3.8 | |
| <i>Bathing facilities in the house</i> | | | | | < 0.0001 |
| Yes | 1106 | 92.2 | 31 | 2.8 | |
| No | 94 | 7.8 | 14 | 14.9 | |

^aHair which could not be collected and tied.

^bIn 9 cases the mother had died and data were missing for the others.

^cIn 21 cases the father had died and data were missing for the others.

which did not have a bath. Just over 60% of the students we examined had short hair that could not be collected and fastened.

Prevalence of pediculosis capitis among the primary-school pupils we studied in Kerman city was 3.8% overall (45 pupils). Of those infected, 95.5% were females. The highest prevalence of infestation was among 9-year-olds (6.6%). Students with short hair had a lower infestation rate (1.2%). Of the 636 girls, 462 had long hair and 36 (7.8%) of these were infested. Just 7 (4.0%) of the 174 girls with short hair were infested.

Prevalence of head louse infestation among pupils who were living in large families (> 10 family members) was greater (13.3%) than among others and the rate of infestation was also greater among students whose parents' education level was low. In addition, the infestation rate was greater among pupils who were living in families with poor socioeconomic conditions and who did not have separate facilities for bathing in their house.

Based on chi-squared tests, the relationship between head louse infestation and all of the variables examined was statistically significant (Table 1).

Discussion

Comparing of the prevalence of pediculosis capitis is very difficult task both between different countries and between different areas within a country because many factors, e.g. socioeconomic, educational, hygienic, are involved.

Pediculosis capitis is the most prevalent condition in school and preschool age groups throughout the world, and especially in developing countries [4]. Head lice ranked third in frequency among all skin disorders among male schoolchildren in Amman [6]. In our study prevalence of head louse infestation was 3.8% in primary-

school students in Kerman city. According to an accomplished investigation in Torine (France), more than 15% of students studied were infected [7]. Head louse infestation was 6.8% in 1007 primary-school children in Sierra Leone [8]. In a similar study in Nigeria, of 6882 primary-school pupils, 3.7% were infected [9]. Prevalence of infestation was 9.4% in 785 primary-school children in Turkey [10]. The rate of infestation was 81.5% among schoolchildren in Argentina [11].

Overall, 13.4% of students were infected with nits or immature or adult lice in northern Jordan, and girls showed a higher prevalence than boys [12]. In our study, the prevalence of head lice in girls was also greater than in boys. This is in agreement with results of a number of other studies [10,13,14].

In addition, in our study the highest rate of infestation was seen in 9-year-old students. Similar findings have been reported in a number of other studies [6-8,11,12,15,16]. In our study there was a relationship between the rate of infestation and parents' education and socioeconomic and sanitary conditions. This is in agreement with results of a number of previous studies [4,10,11,].

Conclusions

Improvements in socioeconomic and cultural conditions may reduce the prevalence of pediculosis capitis because these are factors which affect the rate of infestation. Implementing health education programmes for students, and possibly parents too, may help in controlling this health problem. These measures along with curing infected students and possible cases within the family will decrease the rate of infestation and lead to greatly improved control.

References

1. Dold S et al. Genetic risk for asthma, allergic rhinitis, and atopic dermatitis. *Archives of diseases in childhood*, 1992, 67(8):1018–22.
2. Markkola L, Mattila KJ, Koivikko MJ. Sauna habits and related symptoms in Finnish children. *European journal of paediatrics*, 1989, 149(3):221–2.
3. Huh S et al. Prevalence of head louse infestation in primary-school children in Kangwon-do, Korea. *Korean journal of parasitology*, 1993, 31(1):67–9.
4. Aydemir EH et al. Pediculosis capitis in Istanbul. *International journal of dermatology*, 1993, 32(1):30–2.
5. Verhagen AR et al. Skin diseases in Kenya. A clinical and histopathological study of 3168 patients. *Archives of dermatology*, 1968, 98:577–86.
6. Shakkoury WA, Abu-Wandy E. Prevalence of skin disorders among male schoolchildren in Amman, Jordan. *Eastern Mediterranean health journal*, 1999, 5(5): 955–9.
7. Combescot C. Epidémiologie actuelle de la pédiculose a *Pediculus capitis* [Current epidemiology of *Pediculosis capitis*]. *Bulletin de l'Académie Nationale de Médecine*, 1990, 174(2):231–6.
8. Gbakima AA, Lebbie AR. The head louse in Sierra Leone: an epidemiological study among school children in the Njala area. *West African journal of medicine*, 1992, 11(3):165–71.
9. Ebomoyi EW. *Pediculosis capitis* among urban school children in Ilorin, Nigeria. *Journal of the National Medical Association*, 1994, 86(11):861–4.
10. Inanir I et al. Prevalence of skin conditions in primary-school children in Turkey: differences based on socioeconomic factors. *Pediatric dermatology*, 2002, 19(4): 307–11.
11. Chouela E et al. Head louse infestations: epidemiologic survey and treatment evaluation in Argentinian schoolchildren. *International journal of dermatology*, 1997, 36(11):819–25.
12. Amr ZS, Nusier MK. *Pediculosis capitis* in northern Jordan. *International journal of dermatology*, 2000, 39(12):919–21.
13. Wegner Z, Racewicz M, Stanczak J. Occurrence of *Pediculosis capitis* in a population of children from Gdansk, Sopot, Gdynia and the vicinities. *Applied parasitology*, 1994, 35(3):219–25.
14. Hong HK et al. Infestation rate of head lice in primary children in Incheon, Korea. *Korean journal of parasitology*, 1995, 33(3): 243–4.
15. Fan PC et al. Present status of head louse (*Pediculosis capitis*) infestation among schoolchildren in Yunlin County, Taiwan. *Gaoxiong yi xue ke xue za zhi*, 1991, 7(4): 151–9.
16. Suleman M, Jabeen N. Head lice infestation in some urban localities of NWFP, Pakistan. *Annals of tropical medicine and parasitology*, 1989, 83(5):539–47.