

Losing the Louse: How to Manage this Common Infestation in Children

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Lice (plural), louse, pediculosis, nits, ectoparasitic insects of the order Phthiraptera, *Pediculus capitis*, head lice, *Pediculus corporis*, *Pediculus humanus humanus*, body lice, *Pediculus vestimenti*, *Pediculus pubis*, pubic lice, crabs. All are names associated with a 2 to 3 mm, gray-white insect that has been in existence for 10,000 years and is known to infest the human body. When uncontrolled, this tiny bug lives on the skin of human bodies, proliferates in large quantities, and spreads to those in close contact with the "host" (Araújo et al., 2000).

While this may sound like part of a science fiction script, the reality is that lice infestations impact children and adults worldwide, and remain indiscriminate to gender, age, and socioeconomic status. Lice are considered the most common infestation occurring in children, with the prevalence increasing in every country over the past three decades (Falagas, Matthaïou, Rafailidis, Panos, & Pappas, 2008).

Humans host three different kinds of lice: head lice (*Pediculus capitis*), body lice (*Pediculus humanus humanus*, sometimes called *Pediculus humanus corporis*), and pubic lice (*Phthirus pubis*). The female louse lives approximately 30 days, during which time she will lay 3 to 10 eggs (nits) per day. These nits attach firmly to the hair shaft

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This article aims to provide an overview of the symptoms, diagnosis, and treatment for lice infestations in children. Management of the condition by parents in the home is presented, as well as ways to prevent spread in the community. Nurses in acute care, outpatient, and school settings may use this information to teach families how to prevent a lice infestation and treat an infestation when it occurs.

regions close to the scalp and other body regions. After 6 to 10 days, the nits hatch as nymphs, become adults in 10 to 15 days, and the new females begin laying eggs. Adult lice live for about 10 days; however, adult lice live only about 48 hours if not in contact with a human host.

Transmission of lice occurs by direct contact with an infested person or transferred by *fomites*. Carpeting, pillows, bed linens, hats, brushes, and ribbons from infested children are all possible fomites or sources of transmission. Pets and other animals are not fomites. Lice have been known to transmit diseases, such as typhus, trench fever, and relapsing fever.

Symptoms and Diagnosis

The symptoms of lice infestation include intense itching (pruritus). Any body area, including the scalp, may show signs of the child's intense scratching, such as erythema, scaling, and excoriation of the skin. Small, red bumps on the scalp, neck, and shoulders that may become crusty and ooze may also be visible. Head lice infestation is commonly first suspected when children are observed scratching their heads vigorously. Listlessness or poor school performance may also be clues, indicating the child's high level of distraction. On inspection of the scalp, tiny white specks (whitish to sandy colored eggs [nits]) can be easily seen on the hair shafts in natural light and will be difficult to remove. Nits can easily be mistaken for dandruff, but the critical difference is that nits must be picked off to be removed. Nits fluoresce white under Wood's light. Adult

lice may be visualized under a microscope or a magnifying glass. They range in color from light beige to black and have six claw-like appendages.

Management

Treatment for lice can be completed at home and involves applying a pediculicidal agent, removing nits, and thoroughly cleaning (delousing) the environment. All three steps are critical to preventing recurrence. All potentially exposed persons should be examined and treated if infested. School and daycare settings are susceptible environments for the transmission of lice due to the close proximity of children and the frequency with which they have physical contact with each other and their personal items.

Pediculicidal Agents

Pediculicidal agents include permethrin 1% (preferred agent) and pyrethrins; common brand names include Kwell®, Nix®, Rid®, and Pronto®. A 1% lindane shampoo can also be used to treat resistant head lice; however, lindane use is controversial because of concerns about neurotoxicity and is only available by prescription. Malathion (Ovide®) has been shown to kill both nonresistant and resistant lice, and is available by prescription. Malathion may cause respiratory depression if ingested and should not be used on neonates and infants, and its safety in nursing mothers and children younger than 6 years is uncertain (Flinders & De Schwenitz, 2004; Frankowski, Weiner, & the Committee

on School Health and Committee on Infectious Diseases, 2002). Malathion should be considered for use only when other agents have failed. An expected side effect of these topical agents is itching and burning of the scalp or skin area where the ointment is applied. The FDA now requires the labeling for malathion to include information about the side effects of the stinging sensation and the potential for chemical burns, including second-degree burns (Mississippi Division of Medicaid, 2012). If burning and itching persists for several days, corticosteroids and oral antihistamines may be ordered to help relieve these symptoms.

Newer treatment products include spinosad 0.9% (Natroba®) and benzyl alcohol 5% (Ulesfia® Lotion). Spinosad is a topical agent approved by the FDA in 2011 to treat children 4 years of age or older (Brown & Rowland, 2012). This product is both a pediculicide and an ovicide, killing both the lice and the nits. This eliminates the need for extensive combing of the hair to get rid of the nits. The product is applied to dry hair and washed off with water after 10 minutes. Repeat application, though not generally needed, may be done 7 days later if live lice are seen. Brown and Rowland (2012) share concerns that the cost may be prohibitive to many families – “the average cost of an application of permethrin 1% is about \$20; an application of spinosad costs \$270 without insurance” (p. 42). Ulesfia Lotion is approved for patients 6 months of age or older. Similar to spinosad, the lotion is also applied to dry hair and rinsed off within 10 minutes. However, re-application is required in 7 days. Both spinosad and Ulesfia Lotion contain benzyl alcohol and have serious side effects (including death) when applied to children younger than 6 months of age (Mississippi Division of Medicaid, 2012).

When teaching parents about pediculicide treatment, emphasize that more is not better. Directions for application must be strictly followed. Repeat the application in 7 to 10 days if live lice are present. Overuse and misuse may lead to absorption into the bloodstream and the possibility of adverse effects. The child’s eyes must be carefully protected, and the parent should wear rubber gloves. Pediculicides cannot be used on eyebrows or eyelashes because they are irritating. Rather, lice infestation in these areas is treated by applying petrolatum to the lashes and brows three to

Figure 1.
Effective Delousing of the Environment

- Wash all of the child’s sheets, blankets, pillowcases, pajamas, underwear, and recently worn clothes in hot water. Dry in hot dryer for at least 20 minutes.
- Vacuum all floors, rugs, play and sleep areas, and furniture of both home, school, and daycare facilities.
- Soak combs and brushes for one hour in a solution made from anti-lice shampoo or in a solution of 1.5 tablespoons of Lysol® and 1 quart water, followed by a hot water rinse.
- It is unnecessary to have the house sprayed or fumigated because this can be toxic to humans and pets.

Source: Bowden & Greenberg, 2010.

four times a day for 2 weeks. The petrolatum seems to suffocate the insects. The nits can then be removed with a fine-toothed comb or tweezers.

Infestation in infants should never be treated with pediculicidal products. Rather, the lice and nits should be manually removed or hand combed. Pregnant women and persons allergic to pediculicidal agents should never apply treatment with these agents. Parents should be warned to avoid treating lice infestation with home remedies. Dog shampoo, vinegar, and kerosene have not been clinically proven to be effective against lice (Frankowski et al., 2002).

After the child is treated for lice, parents should contact a health care provider if the child’s itching interferes with sleep or the rash is not cleared within one week after treatment. Further, if the rash or sores begin to look reddened, are warm to the touch, or are oozing secretions, or if the child develops a fever, the health care provider should be called. Most importantly, the child should be assessed 7 to 10 days after treatment to ensure no new nits have appeared.

Removing Nits

Nit removal, while tedious and time-consuming, is absolutely necessary. None of the pediculicides are 100% ovicidal (effective in killing all lice). Therefore, manual removal of nits after treatment with a pediculicide is recommended (Madke & Khopkar, 2012).

To remove the nits, divide the child’s towel-dried hair (not sopping wet) into four parts and insert a fine-tooth comb at the top of the head first. If nits fall into the lower hair, they will be removed with combing of the inferior areas. Two types of combs are available – those with plastic teeth and those with metal teeth. Metal combs come in two varieties – those

made from a flat sheet of metal and have rectangular teeth, and those that have cylindrical teeth embedded in a plastic base (Speare, Canyon, Cahill, & Thomas, 2007). The Lice Meister® is a metal comb recommended by the National Pediculosis Association (2011) that had demonstrated efficacy for nit removal over a plastic-tooth comb in one study (Speare et al., 2007).

Check the heads of everyone else in the home, school, or daycare, and treat any scalp rashes, sores, or itching with the anti-lice shampoo. Children can return to school after one treatment with the shampoo or medicine.

Delousing the Environment

The environment must be thoroughly cleaned because transmission occurs from direct contact (body to body, hair to hair) or indirect contact (clothing, brushes, and hair apparel). Lice cannot live more than 48-72 hours off the human body. Therefore, the house should be vacuumed thoroughly, combs and brushes should be soaked in antilice shampoo, and all clothing and sheets should be washed in hot water (see Figure 1).

To prevent lice infestations at daycare and school settings, encourage teachers, parents, and care providers to do the following:

- Have carpeted areas frequently vacuumed.
- Discourage body contact and sharing of personal items between children (for example, hats, coats, combs, and similar personal items).
- Remove from the classroom items (such as costumes, pillows, and blankets) that may be shared or used during playtime by numerous children.
- Know how to examine for and identify lice.

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- Notify the nurse if a case is found.
- Store naptime supplies in a clean area and send them home for frequent cleaning.
- Have student clothes-storage areas (lockers) separated adequately by space and not be shared.
- Check the child's head after attending a sleepover or camp where children may share sleeping areas.

Nursing Implications

Nurses play an important role in notifying parents about prevention, detection, and school/program treatment policies. The American Academy of Pediatrics (AAP) recommends that when a child in school is discovered to have lice, rather than being sent home, he or she should be discouraged from close direct head contact with others (Frankowski et al., 2002). Notification of the child's parents or guardian may occur by phone or written note sent home at the end of the school day. The importance of prompt treatment is emphasized as a means to treat the affected child and to protect others from infestation.

School and daycare facilities are encouraged to have nit policies in place that indicate when a child may return to school. The AAP and the National Association of School Nurses (2011) state that the child should be allowed to return to school after proper treatment (Frankowski et al., 2002). A treated child's hair should be examined on return to school for the presence of residual eggs, which could signal reinfestation or may indicate that treatment was not initiated. Screening for lice should be done so that confidentiality is maintained. Screening programs for lice should be instituted periodically, with parental notification given in advance. Screening is best completed by using disposable wooden screening sticks, which are used to separate hair strands and provide easy visibility, under good lighting, for the nurse to see the nits in the child's hair. New sticks are used for each child and provide a hygienic way for the nurse to evaluate the child's scalp without having the costly expenditure of using a clean set of disposable gloves to examine each child.

Lice infestations can be a source of embarrassment for the child and family members. Parents may feel upset

and angry when they learn their child has acquired a lice infestation. It is important for the nurse to emphasize how easily lice are spread from one person to another, and how this condition does not reflect on an individual's personal hygiene habits. Nurses can provide home care instructions to prevent infestations and effectively manage spreading to other children and family members. Encourage parents to comb their child's hair each day and use this as an opportunity to assess the scalp for those pesky nits. If nits are discovered, they should be treated immediately, and others with whom the child may have close contact should be notified to assess for lice. Finally, children need not miss school or activities with friends because of lice. ■

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