

BRIEF COMMUNICATION

SELF-DIAGNOSIS OF ACTIVE HEAD LICE INFESTATION BY INDIVIDUALS FROM AN IMPOVERISHED COMMUNITY: HIGH SENSITIVITY AND SPECIFICITY

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SUMMARY

To compare sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of self-diagnosis for head lice infestation with visual inspection, we conducted a study in an urban slum in Brazil. Individuals were asked about active head lice infestation (self-diagnosis); we performed visual inspection and thereafter wet combing (gold standard). Of the 175 individuals included, 77 (44%) had an active head lice infestation. For self-diagnosis, sensitivity (80.5%), specificity (91.8%), PPV (88.6%) and NPV (85.7%) were high. Sensitivity of visual inspection was 35.1%. Public health professionals can use self-diagnosis as a diagnostic tool, to estimate accurately prevalence of pediculosis in a community, and to monitor ongoing intervention strategies.

KEYWORDS: Head lice; Epidemiology; Diagnosis; Sensitivity; Specificity; Predictive values.

Head lice infestation is a public health problem in many resource-poor communities world-wide^{1,2,6,7}. Prevalence may be as high as 40% in the general population, and children may experience up to 19 infestations per year (D. Pilger, unpublished observation). The risk of morbidity as a consequence of secondary bacterial infection is high⁶. Nonetheless, in impoverished communities head lice are often regarded as nuisance rather than a disease⁵. As a consequence, any time-consuming method for diagnosis of active infestation, even if highly sensitive and specific, is unlikely to be put into practice. Self-reporting of active head lice infestations by residents of poor neighborhoods has shown to have a positive predictive value (PPV) of 98% and was suggested as an effective means to diagnose the disease in these settings⁴.

The aim of this study was to scrutinize the diagnostic value of self-diagnosis for active head lice infestation in an urban slum, and to compare sensitivity, specificity and predictive values with visual scalp inspection. Also, with sensitivity and specificity known, public health professionals will be able to use self-diagnosis for screening programs.

We performed this study in a *favela* in Fortaleza, the capital of Ceará State in northeast Brazil. The prevalence of head lice in the area is estimated > 40% in the general population, and socio-economic conditions are precarious⁶. From a pool of families known to the researchers from other studies conducted in the past, we randomly selected 70 families.

Two investigators visited the families in their homes. The first investigator asked the present household members if they thought to have currently an active head lice infestation. The second investigator, experienced in visual inspection and blinded regarding the answers of the individuals, performed a two-step clinical examination: first, the head and scalp were examined systematically for the presence of vital head lice by parting the hair with a comb (visual inspection). Second, wet combing was performed: the hair was moistened with tap water, and conditioner was applied; then the hair was combed systematically, using a fine-toothed head lice comb, until all conditioner was removed. After each strike the comb was skimmed over a soft white paper, and the paper examined for adults or nymphs of head lice using a magnifying glass. Wet combing is considered to be the most sensitive diagnostic method for detecting active infestation³ and was therefore used as gold standard. Active infestation was defined as the presence of nymphs and adults on the scalp. Since the macroscopic examination of eggs does not allow concluding on their viability with sufficient certainty,² whether or not eggs were cemented on the hair was not considered as an indicator of active infestation. Sensitivity, specificity, PPV, negative predictive value (NPV) and their respective 95% confidence intervals were calculated, using wet combing as gold standard.

The study was approved by the ethical review board of the Federal University of Ceará (Brazil). All individuals with active head lice infestation received treatment (200 mg/kg of ivermectin, second dose after 10 days).

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In total 175 individuals, 108 (62%) females and 67 (38%) males were included. The median age was 12 years (range: 1-75 years). The median family size was six members (2-11). The study population had a low education status; only 20% had completed or were enrolled in secondary school.

Seventy-seven (44%) had an active head lice infestation. The Table details sensitivity, specificity, PPV and NPV for self-diagnosis and visual inspection. All predictive values were high for self-diagnosis. Visual inspection showed a very high specificity and PPV, whereas sensitivity was low (Table).

Table

Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) for self-diagnosis and visual scalp inspection, using wet combing as gold standard

	Self-diagnosis (95% confidence interval)	Visual inspection (95% confidence interval)
Sensitivity	80.5% (71-90)	35.1% (24-46)
Specificity	91.8% (86-97)	100% (...-100)
PPV	88.6% (81-96)	100% (...-100)
NPV	85.7% (79-93)	66.2% (59-74)

The results of our study confirm self-reporting as a highly sensitive and specific method to diagnose active head lice infestation in a resource-poor setting. PPV and NPV were high. The PPV is lower than in a previous study in a similar area⁴. Since another study on head lice was performed in this area shortly before this study, individuals may have tended to over-report infestations, expecting treatment. As stated previously by other authors, visual examination cannot be considered an effective means to diagnose active infestation². However, its specificity was 100%.

We conclude that in communities with high prevalence of pediculosis capitis health care providers can rely on diagnosis made by patients, rather than performing time-consuming and less accurate diagnostic tests, such as visual inspection. In addition, as sensitivity and specificity were high, public health professionals can use self-diagnosis as a screening method to estimate accurately prevalence of pediculosis in a community, and to monitor the success of ongoing intervention strategies. This is of particular importance in resource-poor settings, where resources and access to health care are limited.

RESUMO

Auto diagnóstico de pediculose por indivíduos de uma comunidade economicamente desfavorecida: alta sensibilidade e especificidade

Foi conduzido um estudo em uma favela urbana no Brasil com o objetivo de comparar a sensibilidade, especificidade, valor preditivo positivo (VPP) e valor preditivo negativo (VPN) do auto-diagnóstico de pediculose com a inspeção visual. Dos 175 indivíduos incluídos, 77 (44%) apresentavam pediculose. Para o auto-diagnóstico, a sensibilidade (80.5%), a especificidade (91.8%), o VPP (88.6%) e o VPN (85.7%) foram altos. A sensibilidade da inspeção visual foi 35.1%. Profissionais de saúde podem utilizar o auto-diagnóstico como uma ferramenta diagnóstica para estimar de forma acurada a prevalência de pediculose em uma comunidade, como também para monitorar estratégias de controle da doença.

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