Self-Diagnosis of Head Lice Infestation in Rural Nigeria as a Reliable Rapid Assessment Tool for Pediculosis

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Abstract: Pediculosis capitis is a common disease in industrialized countries, but there are also areas in sub-Saharan Africa where head lice infestations are highly endemic. However, there are no data available from the African continent on the accuracy of head lice diagnosis made by affected individuals.

We performed a door-to-door survey in Skanko village (Kwara State, Central Nigeria). Individuals were asked to answer a question regarding their head lice status, and then wet combing with conditioner was performed to diagnose an active infestation.

Active head lice infestation was observed in 144 (29.0%) of the 496 participants. Less than 1% of those without pediculosis stated being infested; and more than 90% of individuals with heavy infections did so. In contrast, only 47% of individuals with ≤5 lice were aware of their infestation. Overall sensitivity (73.6%), specificity (99.1%), positive predictive value (97.2%) and negative predictive value (90.2%) of self-diagnosis, as compared to wet combing were high.

Our data show that interviewing individuals about their infestation status can be used as a simple rapid assessment method for diagnosing head lice in a typical rural setting in Nigeria.

INTRODUCTION

In sub-Saharan Africa scarcity of resources and trained health personnel lead to neglect of minor parasitic diseases such as pediculosis capitis (head lice infestation). Pediculosis capitis is a common disease in industrialized countries [1, 2], but there are also areas in sub-Saharan Africa where pediculosis is highly endemic [3]. This fact has rarely been perceived by the scientific community, and consequently few studies are available from this region [3, 4].

Reasons for this are multi-faceted. A major reason is that due to poor access to health services and the presence of other more serious and life-threatening parasitic diseases, such as malaria, filariasis and schistosomiasis, pediculosis is usually not an issue justifying health interventions in sub-Saharan Africa, and is also not considered an important disease by health professionals (Ugbomoiko, unpublished data). Thus, an easy and accurate rapid assessment method is needed to diagnose pediculosis in communities where medical or paramedical resources are not available to assist.

Previous data from Brazil have shown that people in urban endemic communities diagnosed their head lice infestations with high positive predictive values (PPV) of 89% and 98%, respectively [5, 6]. However, in Australia, a developed market economy, sensitivity of parental diagnosis of head lice in children was very low (16%), with a PPV of 67% [7]. Similarly, in Mexico schoolchildren self-diagnosing pediculosis had a low sensitivity, even though they were asked about the presence of nits, and not of active infestations [8]. Unfortunately, in that paper an error was made in calculation of the epidemiological parameters, and predictive values were not given. Our recalculations using the original data give sensitivity of 46%, specificity of 94%, PPV of 68% and negative predictive value (NPV) of 86%.

In the Brazilian study, the authors concluded that treatment of head lice infestations could be based on self-diagnosis, and that there is no need for resource-intensive and unnecessary diagnosis by clinical inspection [5, 6]. On the contrary, in Australia the conclusion was that parental reporting was not a reliable indicator of pediculosis [7]. This would also apply to the diagnostic accuracy of the Mexican schoolchildren.

Since there are no data available from the African continent on the accuracy of head lice diagnosis made by affected individuals or their guardians, we performed a population-based study in a rural community in Nigeria where pediculosis is endemic, to determine sensitivity, specificity and predictive values of self-diagnosis, compared to combing with conditioner as the reference diagnosis.

MATERIALS AND METHODS

The study was conducted in Skanko village (Kwara State, Central Nigeria), a small rural community located about 140 km from Ilorin, the State's capital, with a population of 590 people. The villagers are predominantly illiterate and subsis-

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tence farmers, thus socio-economic and sanitary conditions are poor.

We performed a door-to-door survey which included all households in Skanko. After obtaining consent, the individuals present in each household were asked to answer a single question regarding their head lice status: "Do you have lice on your head?". The mere presence of nits was not asked for, as they do not prove active infestation. In the case of small children (< 7 years of age), the parents acted as the information source. We then performed wet combing with conditioner to diagnose an active infestation, defined as the presence of adult lice or nymphs. Wet combing with conditioner is considered a sensitive method for diagnosing pediculosis [9]. The head was moistened with water, a commercially available hair conditioner was applied, and then the hair was combed with a fine-toothed plastic head lice detection comb of good quality. Previous studies had demonstrated a good quality plastic fine-toothed comb to be as effective as a metal toothed comb in removing adults and nymphs [10]. Each strike of the comb was skimmed on a clean white paper, until the conditioner was completely removed. The paper was examined for adult lice and nymphs, using a magnifying glass. The number of lice were counted and results arbitrarily grouped into light infection (≤5 lice) and moderate or heavy infection (>5 lice). If hair was plaited, plaits were opened before examination.

To avoid observation bias, interviews and wet combing were performed by different investigators. The investigator responsible for diagnosis was blinded to the response of the study participant.

Data were entered into an Excel spreadsheet, checked for entry-related errors and transferred to Epi Info version 6.04d (Centers for Disease Control and Prevention, USA). To describe the accuracy of self-diagnosis, sensitivity, specificity, positive predictive and negative predictive values were calculated from a 2 x 2 contingency table, with wet combing as the reference method, using the respective Epi Info Module.

The study was approved by the ethics committee of University of Ilorin, Kwara State, and in addition by traditional community leaders of the community. Study participants gave informed written consent. In case of illiteracy, individuals gave verbal consent and a thumb print.

RESULTS

In total, 496 individuals (84.1% of the target population) agreed to participate. Active head lice infestation was observed in 144 (29.0%) participants, 11.7% and 17.3% with light (≤5 lice) and moderate or heavy (>5 lice) infestations, respectively (Table **1**). The response of individuals regarding their infestation status, stratified by parasite load, is presented in Table **1**. Less than 1% of those without pediculosis stated being infested; and more than 90% of individuals with heavy infections did so. In contrast, only about half of individuals with ≤5 lice were aware of their infestation (Table **1**).

Overall sensitivity, specificity and predictive values were high and are given with their respective 95% confidence intervals (Table **2**).

DISCUSSION

Our data showed that self-diagnosis of active pediculosis in adults and in children by guardians can be used as an accurate rapid assessment method in this rural community in Nigeria.

A study by Anosike *et al.* (2007) in five states of Nigeria assessed clearance of pediculosis as an additional benefit of an ivermectin onchocerciasis control program [11]. They did not examine people for head lice, but relied on self-diagnosis. This study adds confidence to their finding that the ivermectin program did in fact clear pediculosis.

Table 1. Relationship Between Number of Individuals or their Guardians Reporting Head Lice Compared with Lice Detected by Wet Combing, Stratified by Parasite Load

Level of Pediculosis	Number Reporting Head Lice/Total	Percent Reporting Head Lice	Percent with Head Lice Detected of Total Surveyed
No lice detected	3/352	0.9%	-
Light infestation (≤5 lice)	27/58	46.6%*	11.7%
Heavy infestation (>5 lice)	79/86	91.9%*	17.3%
Total	108/496	21.8%	29.0%

* = Sensitivity for this category.

Table 2. Sensitivity, Specificity and Predictive Values of Self-Diagnosis, as Compared to Wet Combing

	% (95% Confidence Interval)
Sensitivity	73.6% (65.5-80.4)
Specificity	99.1% (97.3-99.8)
Positive predictive value	97.2% (91.6-99.3)
Negative predictive value	90.2% (86.7-92.9)

Rapid assessment methods using self-diagnosis have been used for a limited number of parasitic diseases with distinctive signs, such as haematuria in urinary schistosomiasis [12, 13]. Diseases that can be reliably self-diagnosed enable health personnel and community health workers in affected populations to collect epidemiological data about the prevalence of a disease in a cost-effective manner [11]. In addition, self-diagnosis of pediculosis in this region could be a basis for treatment of head lice infestation without confirmation by health care personnel.

The value of self-diagnosis of pediculosis varies greatly with geographic location and population [5-8]. However, in

all studies (Mexico, Brazil, Australia and the current study from Nigeria), sensitivity was lower than specificity and predictive values. Sensitivity in the Australian population was so low (16%) as to make self-diagnosis of limited value as a cost-effective survey tool. In all studies, however, specificity was high as was NPV.

CONCLUSION

We have shown that interviewing individuals about their infestation status can be used as a simple rapid assessment method for diagnosing head lice in a typical rural setting in West Africa.

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