

Short Report

Ability of mothers to assess the presence of fever in their children: Implication for the treatment of fever under the IMCI guidelines

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Abstract

Background: Fever is a common reason for seeking medical attention, with febrile illnesses accounting for 10% to 20% of pediatric visits to emergency departments. A history of fever or presence of fever by palpation or measured temperature is required on the Integrated Management of Childhood Illnesses (IMCI) algorithms as a reason for the assessment of fever, which will lead to specific classifications that are linked to treatment protocols. Therefore, the WHO and its partners assume that mothers are able to assess their children for the presence of fever.

Objectives: To evaluate the ability of mothers to determine the presence of fever in their children by tactile examination of their children.

Methods: We prospectively studied 126 mother-child pairs attending the pediatric outpatient clinic of Ahmadu Bello University Teaching Hospital (ABUTH). Mothers of children 2 months to 5 years of age who mentioned fever as part of the presenting complaints were studied using a structured questionnaire regarding their children's illness, temperature status and their educational level.

Results: A total of 126 mother-child pairs were studied, of which 44 (34.9%) of the mothers had had their education extended to secondary school level and only 15 (11.9%) had their education extended to a tertiary level. Fever was present in 82 (65.1%) of the children when their temperatures were determined by thermometer. The mothers correctly identified 79 (sensitivity of 96.3%) of the children who were truly febrile and 19 (specificity of 43.2%) of those who were truly nonfebrile. The predictive value of a positive test was 76.0%, and the predictive value of a negative test was 86.4%.

Conclusion: The results showed that mothers in our environment, as has been observed in other parts of the world, are able to correctly assess the presence or absence of fever in their children.

Keywords: Fever, mothers, palpation, sensitivity

Résumé

Arrière-plan : La fièvre est une raison commune pour la recherche d'une attention médicale, avec maladies fébriles représentent 10-20 % des visites d'urgence pédiatrique départements. Une histoire de la peste ou la présence de la peste par palpation ou mesurée température est nécessaire sur les algorithmes de PCIME comme motif de l'évaluation de la peste, ce qui conduira à des classifications spécifiques qui sont liées à protocoles de traitement. Par conséquent l'OMS et ses partenaires supposent que les mères sont mesure d'ânes leurs enfants pour la présence de la peste.

Objectifs : Pour évaluer la capacité des mères à déterminer la présence de la fièvre dans leurs enfants, tactiles d'un examen de leurs enfants.

Méthodes : Nous avons étudié manière prospective 126 paires de mère-enfant participant à la pédiatrique des patient clinique de ABUTH. Mères d'enfants de 2 mois jusqu'à 5 les années qui mentionné la fièvre dans le cadre des présentation plaintes ont été étudiées. à l'aide d'un questionnaire structuré concernant leur maladie des enfants, température statut et leur niveau d'éducation.

Résultats : 126 mère-enfant paires ont été étudiés de qui 44(34.9%) de la les mères avaient eu leur éducation étendue au niveau secondaire et seulement 15 (11,9 %) leur éducation avait étendu à un niveau tertiaire. La peste était présente dans

82 (65,1 %) des enfants lorsque les températures ont été déterminés par thermomètre. Les mères correctement identifié 79 (sensibilité de 96.3 %) de la les enfants qui ont été vraiment fébriles et 19 (spécificité du 43,2 %) de ceux qui ont été véritablement non-fébrile. La valeur prédictive d'un test positif a été 76.0 % et le valeur prédictive d'un test négatif a été 86,4 %.

Conclusion : Les résultats ont montré que mères dans notre environnement, comme cela a été observés dans d'autres parties du monde, sont en mesure d'évaluer correctement la présence ou l'absence de peste dans leurs enfants.

Mots clés: La peste, palpation, sensibilité, les mères

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Introduction

In the pediatric age group, fever is one of the commonest reasons for seeking medical attention,^[1] with febrile illnesses accounting for 10% to 20% of pediatric visits to emergency departments.^[2,3] As part of the child survival strategy, WHO and UNICEF, in 1995, initiated the Integrated Management of Childhood Illnesses (IMCI) to assist developing countries reduce childhood mortality caused by most childhood killer diseases — diarrhea, acute respiratory infections, malaria, measles and malnutrition.^[4] Fever is part of the assessment steps on the IMCI algorithms. A history of fever or presence of fever by palpation or measured temperature is required as a reason for the assessment of fever, which will lead to specific classifications that are linked to treatment protocols.^[4] Therefore, the WHO and its partners assume that mothers are able to assess their children for the presence of fever. The commonest way mothers assess their children for fever is by palpation. However, it has been reported that a mother's description of tactile examination of her child as part of the clinical history provides the doctor with little useful information about fever.^[5] To the best of our knowledge, there has not been any study in our environment designed to evaluate mothers' ability to assess the presence of fever in their children. This study was therefore aimed to evaluate the ability of mothers to assess the presence of fever in their children in our environment.

Methods

This comparative study was carried out at the pediatric outpatient department of our hospital (Ahmadu Bello University Teaching Hospital, Zaria). Despite being a referral center, over 90% of the clients present to the department directly without referral. The clinic runs on a daily basis, including weekends, and sees an average of 70 children per week. Zaria is situated in an area of northern guinea savannah, with the population consisting predominantly of farmers, artisans and traders. It has a general hospital situated in the main traditional Zaria city, many government health

centers and private clinics scattered all over the town.

Mothers of children aged 2 months to 5 years who mentioned fever as part of the presenting complaints were eligible to be included in the study. Sampling of mothers was done on weekdays when one of the authors (RDW) was scheduled to attend to patients in the pediatric outpatient department according to the clinic roster. All mothers of children aged 2 months to 5 years who presented to the pediatric outpatient clinic on these days and mentioned fever as part of the presenting complaints were recruited for the study. Verbal consent was obtained from the mother/ guardian of an eligible child. Nature of the study was explained to the mothers/ guardians in details in the language they best understood. A mother-child pair was excluded from the study if the mother declined to take part in the study. A structured questionnaire regarding the child's illness and temperature status, as well as the mother's educational level, was administered to the mother of an eligible child. All interviews and temperature measurements were done by one of the authors (RDW). On presentation, a mother of an eligible child was asked to determine whether the child had fever by palpation over the child's forehead. Immediately after that, the temperature of the child was recorded using a thermometer. A mercury glass thermometer was used for temperature measurement. Fever was defined as axillary temperature of 37.2°C or more.^[1] Comparative analysis was done by a simple 2 × 2 contingency table.

Results

We studied 126 mother-child pairs, out of which 120 were brought by their biological mothers. There were 66 (52.4%) boys and 60 (47.6%) girls. The ages of the children ranged from 2 months to 59 months. All the children had a history of fever on presentation to the clinic. Of the 126 mothers, 44 (34.9%) had had their education extended to secondary school level, 15 (11.9%) had their education extended to a tertiary level while another 15 (11.9%) had no formal education. In 104 (82.5%) of the 126 children,

fever was present when the mothers were asked to determine the presence of fever by palpation of the child's forehead, while fever was present in 82 (65.1%) of the 126 children when the temperature was determined by thermometer. Compared to the gold standard, mothers' determination of fever by palpation was correct in 79 (96.3%) of these children. This is shown in Table 1. Among the 44 children without fever by temperature measurement, the mothers correctly identified 19 (43.2%) of them as nonfebrile, giving the sensitivity and specificity of mothers' tactile determination of fever as 96.3% and 43.2%, respectively. The predictive value of a positive test was 76.0%, and the predictive value of a negative test was 86.4%. The performance characteristics of the mothers' determination of fever by palpation were similar across the various educational levels, as displayed in Table 2.

Discussion

This study has demonstrated a high sensitivity (96.3%) of mothers' tactile determination of fever in their children by palpation of the child's forehead. This finding is similar to those reported by Nwanyanwu *et al.* (sensitivity of 97.3%);^[6] Ernst and

Philips, 90.0%;^[7] Graneto and Soglin, 84%;^[8] while Alves and Correia,^[9] as well as Banco and Veltri,^[10] reported a slightly lower sensitivity of 75.9% and 73.9%, respectively. However, the specificity of 43.2% obtained in the present study was lower than the specificities reported by these other workers, ranging from 73.3% to 90.6%, but was higher than the 19.2% reported by Nwanyanwu *et al.*^[6] from Malawi. All these reports seem to suggest that a mother's palpation of her child may be an adequate alternative for the assessment of childhood fever. This is in contrast to an earlier report by Bergenson and Steinfeld^[5] that a mother's description of her tactile examination of the child, as part of the clinical history, provides the doctor little useful information. A possible explanation for the difference in the findings of Bergenson and Steinfeld^[5] when compared with those in most other reports is that paramedical personnel were used to assess the child's fever by palpation in the study by Bergenson and Steinfeld.^[5] A similar situation was found in the report by Nwanyanwu *et al.*,^[6] where clinical officers incorrectly classified as nonfebrile 17.8% of children found to be truly febrile, whereas the mothers incorrectly classified as nonfebrile only 2.6% of the febrile children, making the clinical officers 7-fold more likely than mothers to misjudge fever as being absent when actually it was present. It is possible that the paramedical officers could have been influenced by their background training and therefore were concerned about possible overdiagnosis.

The negative predictive value of 86.4% in this study is similar to that in the report by Nwanyanwu *et al.*,^[6] who obtained a negative predictive value of 92.5%, but much higher than in the report by Alves and Correia (46.8%).^[9] This high negative predictive value is an essential requirement of maternal tactile determination of fever as a screening tool for the presence of fever in children. This is because a negative predictive value is the likelihood that a subject with a negative test does not have the condition tested for.^[11] This is particularly important in poor developing countries where simple clinical tools like a thermometer sometimes are unavailable in health centers. This study has also shown that the ability of mothers to determine the presence of fever in their children by palpation is similar across the various educational levels.

The fever box on the IMCI algorithm leads to the classification of malaria by mothers or other caregivers simply answering "yes" when asked, "Has your child been having fever?" Therefore, a mother's ability to assess the presence of fever in her child is an essential ingredient for achieving the goal of the IMCI strategy. Underdiagnosis of fever by mothers may delay appropriate care, resulting in many

Table 1: Mothers' tactile determination of fever by palpation compared to standard (thermometer determination)

| | Thermometer 37.2°C or more | Thermometer less than 37.2°C | Total |
|-------------------------|----------------------------------|------------------------------------|-------|
| Mother fever Present | 79 | 25 | 104 |
| Mother fever Absent | 3 | 19 | 22 |
| Total | 82 | 44 | 126 |

Sensitivity = $79/82 \times 100 = 96.3\%$
 Specificity = $19/44 \times 100 = 43.2\%$
 Positive predictive value = $79/104 \times 100 = 76.0\%$
 Negative predictive value = $19/22 \times 100 = 86.4\%$

Table 2: Tactile determination of fever compared to fever by temperature measurement across various educational levels

| Educational Level | Fever present by palpation | Fever present by Temp. | | Total |
|------------------------|----------------------------------|---------------------------|----|-------|
| | | Yes | No | |
| Tertiary | Yes | 11 | 3 | 14 |
| | No | 0 | 1 | 1 |
| Secondary | Yes | 33 | 7 | 40 |
| | No | 1 | 3 | 4 |
| Primary | Yes | 22 | 8 | 30 |
| | No | 2 | 8 | 10 |
| Koranic | Yes | 7 | 5 | 12 |
| | No | 0 | 0 | 0 |
| No formal education | Yes | 6 | 2 | 8 |
| | No | 0 | 7 | 7 |
| Total | | 82 | 44 | 126 |

children developing severe disease or even dying at home. On the other hand, overdiagnosis of fever, which consequently results in overclassification of malaria on the IMCI algorithm, will lead to increased exposure of children to potentially toxic drugs and may accelerate the development of antimalarial resistance by the malarial parasite.

This study has shown that mothers in our environment, as has been observed in other parts of the world, are able to correctly assess the presence or absence of fever in their children. Although determination of temperature by the use of a thermometer is the gold standard, mothers' tactile description of fever in their children can be adequate as an alternative method of determining the presence or absence of fever in children, which appears not to be influenced by their educational level.

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