

MATERNAL PERCEPTION OF FEVER IN CHILDREN BY TACTILE TECHNIQUE. HOW VALID IT IS?

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ABSTRACT

Objective: To determine the validity of tactile technique as a tool for fever assessment in children by mothers.

Study Design: A cohort study.

Place and Duration of Study: The study was conducted at the department of Paediatrics, Combined Military Hospital, Bahawalpur, Pakistan, from September 2007 to September 2009.

Patients and Methods: Convenient sampling technique was employed. Three hundred and ninety three children between the ages of 6 months and 5 years, brought to hospital by mothers with history of prolonged fever (7 days or more) perceived by tactile technique. Children were not supposed to be necessarily febrile at the time of enrollment. A six hourly temperature recording was done. Moreover, whenever mothers felt that their child is febrile by using tactile method of their choice, axillary thermometry was done irrespective of the number of recordings. Standard mercury thermometry by axillary technique (without adding a degree to measured value) was chosen. Reading of more than 99.50 Fahrenheit (37.50 centigrade) was labeled as fever. Cases that remained fever free for five days were labeled afebrile and discharged. Mothers were advised to watch for fever for one week at home and to report back immediately if they felt that their child has fever, confirmed by a single tactile measurement. Those who reported back were readmitted and subjected to the same method of monitoring and recording as was applied on first admission. Data was analyzed using SPSS version 17. Descriptive statistics were applied to calculate the frequencies, means and standard deviations.

Results: Among the 392 children 58.4% were males and 41.4% were females. The mean age was 24.4 ± 14.39 months. Majority had a history of fever of 5 to 24 days (70.2%). In only 184 (46.93%) patients fever was confirmed. In 208 (53.08%) patients no fever was recorded and were discharged. Twenty one patients reported back with fever. However, fever was confirmed in only 11 patients. In summary, a total of 195 (49.74%) patients actually had fever while a large population of 197 (50.25 %) did not had fever.

Conclusion: Fever was over estimated by the mothers when detected by tactile technique. Axillary thermometry as a tool for fever assessment at home and clinics should be encouraged. This will significantly reduce the need for undue investigations and unnecessary medications.

Keywords: Axillary thermometre fever, Tactile thermometry.

INTRODUCTION

Incidence of fever is highest during childhood especially between 3 to 36 months of life¹. It is estimated that fever remains one of the most common complaint for as many as one third of all pediatric consultations². Although fever was considered a protective response for thousands of years, the advent of antipyretic drugs has led to the common belief that fever is maladaptive and harmful³ and can cause brain

damage and death⁴.

Concerns for fever by parents may be real or imagined (fever phobia) and therefore assessment and monitoring of temperature is essential for decision making at home and in hospital settings⁴. In developing countries fever is normally determined by tactile perception because of the relatively low level of literacy and the economic cost of reliable thermometers⁵. However, tactile assessment has the tendency to overestimate or underestimate the true core temperature⁴. Even doctors working in busy outpatient departments, believe that obtaining an accurate temperature reading is not worth the time and effort needed to record it and as a result

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rely on maternal history of fever without assessing it objectively. This contradicts the findings of a number of studies supporting the accuracy of maternal perception and touch in detecting fever in children^{4, 6, 14}.

The present study was prompted by the fact that a significant proportion of mothers in our society relies on tactile evaluations of fever and do not employ objective temperature measurements. The present study was therefore undertaken to assess the validity of tactile technique in confirming history of fever in children by mothers.

PATIENTS AND METHODS

This cohort study was conducted at the Paediatric department of Combined Military hospital, Bahawalpur, Pakistan. The study population consisted of children of the army personnel and civilian population stationed at Bahawalpur City or residing in its surrounding rural areas. The duration of study was two years from September 2007 to September 2009. All the children between the ages of 6 months and 5 years, brought to hospital by mothers with history of prolonged fever (7 days or more) perceived by tactile technique were enrolled and included in the study. Children were not supposed to be necessarily febrile at the time of enrollment. All the children with signs and symptoms of acute serious illnesses like central nervous system infections, gastroenteritis with dehydration and pneumonia with respiratory distress were excluded from the study. Also the patients with severe malnutrition, psychomotor retardation or known chronic illnesses like cardiac diseases, chronic respiratory ailment, malignancies and renal failure were excluded from the study.

A total of 392 children were enrolled and admitted according to the inclusion criteria in the study, by convenient sampling technique. At all levels mothers were briefed on the study objective and their verbal consent was received before administering any of the research protocols. Institutional approval was received

and permission to conduct study was granted by the ethical committee of hospital.

In hospital, meticulous temperature monitoring was done. Standard mercury thermometry by axillary technique (without adding a degree to the measured value) was used and readings were taken in Fahrenheit. Before assigning duty in paediatric department, duty nurses were trained and taught in using a thermometer and the skill was verified on regular basis throughout the duration of study. Temperatures were recorded every 6 hours. Moreover, whenever mothers felt that their child is febrile by using tactile method of their choice, axillary thermometry was done irrespective of the number of recordings. The mercury thermometer was placed such that it stayed snug between the anterior and posterior margins of the patient's axilla for 3 minutes. The calibration and reliability of the thermometers was verified on regular intervals by the hospital's electro medical equipment department, as per part of ISO 2000 certification policy. Fever was defined as an axillary temperature of more than 99.5°F (37.5 °C).

Those who were found to have fever were investigated and treated accordingly. Whereas, cases that remained fever free for five days were labeled afebrile and discharged. Mothers were advised to watch for fever for one week at home and to report back immediately if they felt that their child has fever, confirmed by a single tactile measurement. Those who reported back were readmitted and subjected to the same method of monitoring and recording as was applied on first admission. Data was analyzed using SPSS version 17. Descriptive statistics were applied to calculate the frequencies, means and standard deviations.

RESULTS

Among the 392 children, 230 (58.4%) were males and 162 (41.4%) were females. The age ranged from 6 months to 58 months with a mean age of 24.4 ± 14.39 months. Though duration of fever ranged from 5 to 175 days, majority had a

history of fever between 5 to 24 days, which equals a cumulative percentage of 70.2%. The associated symptoms were rhinorrhea in 230 (83.2%), loose motions in 140 (35.7%), generalized aches and pains in 186 (47.4%), and poor appetite in 326 (83.2%).

Single site for fever determination was used in 311 (79.33%) patients, which in order of preference were; forehead in 138 (35.2%), abdomen in 115 (29.33%), and hands and feet in 58 (14.8%) cases. More than two sites were used in 81 (20.67%) patients. 265 (67.60%) mothers used dorsum of their hands while 127 (32.39%) used palmar surfaces to assess temperature. Medication histories revealed that all children (100%) were given antipyretics for their fever. 328 (83.7%) children were given oral or intramuscular antibiotics by general practitioners and 194 (49.5%) had taken antihistamines and antitussives.

In 184 (46.93%) patients fever was confirmed by axillary thermometry, and they were investigated and treated accordingly. The cause of fever confirmed in 89 (48.3%) patients were; malaria (36), enteric fever (24), pneumonia (20) and tuberculosis (9). In 95 (63.9%) patients the cause of fever could not be confirmed and were subjected to further investigations. In 208 (53.08%) patients fever was not detected during the 5 days hospital stay and they were discharged. During the one week of follow up, 21 patients reported back with fever recorded by touch technique at home by mothers. However, fever was confirmed by axillary thermometry in only 11 patients; 3 had malaria, 2 had tuberculosis and in 6 patients no cause could be determined.

So after compilation of results and including the follow up cases, out of the sample population of 392 patients who were claimed febrile by their mothers by tactile assessment, a total of 195 (49.74%) patients actually had fever while a large population of 197 (50.25%) did not have fever.

DISCUSSION

The consequences of failing to notice fever in children can be serious. On the other hand, false positive reading can result in unnecessary investigations or diagnostic approach¹⁵. Despite the importance of fever, from both the parents and physicians perspective, the presence of fever is often determined subjectively by mothers.

The core temperature of the human body lies between 36.4°C and 37.4°C, depending on the time and measurement¹⁶. A universally accepted definition for fever is still elusive¹⁷ and in clinical practice measuring a "true" body temperature is not always possible. However, the Brighton Collaboration Fever Working Group recommends a body temperature greater than 38°C as fever irrespective of device, anatomic site, age, or environmental conditions¹⁷ and a WHO expert study group accepts fever as an axillary temperature measurement of greater than 37.5°C¹⁸.

Although rectal thermometer is the gold standard for assessing core temperature, we chose not to use it for practical and cultural reasons. Also in many previous studies, researchers used axillary thermometry for defining fever, with cut off values ranging from 37.4°C to 38°C (99.3° F to 100.4°F)^{10,12,14,19,20}. We used 99.5°F (37.5°C) as the cut off value to label the patient febrile.

In our study, forehead (35.2%) was the most favoured single site followed by abdomen (29.33%) to assess fever. More than two sites were used in 20.67% patients. Chaturvedi found abdomen, neck and forehead as the best sites to palpate for presence of fever²¹. Singhi and Sood found palpation of more than one anatomical site, for subjective assessment of fever, had a sensitivity and specificity of 100% and 92.2%, respectively¹⁰. In a Nigerian and a Malawian study, the head and neck were the commonest sites used for tactile temperature assessment^{13,22}. Singh M also found the forehead and neck as the most preferred sites for fever assessment in his study²⁰.

Though it is known that receptors for detection of heat and temperature are more concentrated on the palmar surface and finger tips²³ we found dorsum of hand as the preferred side in majority (67.60%) of mothers, while 32.39% used palmar surface to assess temperature. Akinbami FO et al also reported similar results in their study, where 77.1 % of the assessors opined dorsal surface of the hand to be more appropriate for tactile assessment of temperature²².

Medication histories of our sample population revealed that all children (100%) were given antipyretics. Okposio also documents intake of antipyretics and antimalarials only on the basis of mother's perception of the presence of fever²⁴. Similar results varying between 28.9%²⁵ to 73.7%²⁶ are seen in various studies where antipyretics were given without a professional prescription. Many parents administer antipyretics even when there is minimal or no fever; because they believe that a child must always maintain a normal temperature²⁷. Likewise, 83.7% children were given oral or intramuscular antibiotics by general practitioners in our study. Similar, indiscriminate use of antibiotics was seen in studies by Al-Nouri⁵ and Einterz¹².

In our study, out of the sample population of 392 patients, only 195 (49.74%) patients actually had fever when determined by tactile technique and thus it is inferred that it is not a preferred tool for fever assessment. Similar results were seen in other studies. Katz et al found a positive predictive value (PPV) of only 33% for touch technique and declared parental palpation as unreliable⁶. Nwyanwu also doubted the method's validity as it overestimates the presence of fever¹³. Chaturvedi and colleagues, in an Indian study, also found a PPV of 38% and endorsed touch as a non-valid screening test for fever and recommended that a thermometer must always be used to record fever²¹. Singh also concluded that attendants cannot accurately detect fever by palpation and also recommended thermometer use²⁰. Akinbami and others in their

study emphasized the need for objective measurement of temperature as tactile assessment of temperature may overestimate the prevalence of fever found a PPV of 66%²². Einterz and Bates also reported tactile assessment as unreliable in their study¹².

Contrary to the results of our study, a number of studies propagate that maternal subjective fever assessment without the use of a thermometer is a sensitive and reliable method for fever determination in children. In a Nigerian Study sensitivity and specificity of touch technique were found to be 83.3% and 54.1% respectively²⁸. Dunyo SK documented hot body as fever of more than 37.5°C and found a sensitivity and specificity of 79% and 99.3%, respectively²⁹. Wammanda and Onazi reported that maternal ability of fever detection in their children by tactile examination had a sensitivity, specificity and PPV of 96.3%, 43.2% and 76.0%, respectively³⁰. Singhi, Sood in their study showed sensitivity, specificity and PPV of 88.9, 88.6% and 83.2%, respectively¹⁰. Alves and CorreiaJde also supported maternal assessment of fever by palpation and found a sensitivity of 75.9% and a specificity of 90.6%⁷. Graneto and Soglin concluded in their study that mothers are able to provide accurate information about the presence (sensitivity 84%), or absence (specificity 76%) of fever in their children by touch³¹.

In all earlier studies point time observations were made which can be influenced by the patient's general condition, environmental temperatures, over wrapping, and normal fever variations during a day. Our study stands out from earlier work done in this field by its prospective, cross sectional nature and its close resemblance to clinical practice. No categorical answers were demanded from patients in our study rather observations were regularly and repeatedly confirmed. Moreover, by designing a unique methodology; we addressed the common and worrisome issue of prolonged fevers which are not assessed objectively and treated by health care providers, simply on the basis of maternal

history. We highlighted the issue in light of its repercussions like repeated consultations, undue investigations, and prolonged treatments which unfortunately comprise oral and parenteral antibiotics in this part of the world.

At the same time we had few limitations. We believe that in future studies, fever confirmation should have been done by two subjective methods, like rectal and axillary thermometry. This will remove the bias about accuracy of existence of fever and doubts about a single technique's sensitivity and specificity. Also, all patients in our study had a history of fever thus reflecting a pre-selected group of patients.

CONCLUSION

The consequences of failing to notice fever in children can be serious. On the other hand, false positive reading can result in unnecessary investigations, diagnostic approach and treatment. Tactile thermometry over estimates the prevalence of fever in children and objective measurement of temperature is recommended.

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