# Caregiver Low Health Literacy and Nonurgent Use of the Pediatric Emergency Department for Febrile Illness

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## ABSTRACT

***OBJECTIVE:*** To examine the association between caregiver health literacy and the likelihood of a nonurgent emergency department (ED) visit in children presenting for fever.

***METHODS:*** This cross-sectional study used the Newest Vital Sign to assess the health literacy of caregivers accompanying children with fever to the ED. Visit urgency was determined by resources utilized during the ED visit. Findings were stratified by race and child age. Chi-square and logistic regression analysis controlling for race were conducted to determine the association between low health literacy and ED visit urgency.

***RESULTS:*** A total of 299 caregivers completed study materials. Thirty-nine percent of ED visits for fever were nonurgent, and 63% of caregivers had low health literacy. Low health literacy was associated with a higher proportion of nonurgent ED visits for fever (44% vs 31%, odds ratio 1.8, 95% confidence interval [CI] 1.1, 2.9). Low health literacy was associated with higher odds of a nonurgent visit in white and Hispanic caregivers but not in black caregivers. In regression analysis, children ≥2 years old had higher odds of a nonurgent visit if caregivers had low health literacy (adjusted odds ratio 2.0; 95% CI 1.1, 4.1); this relationship did not hold for children <2 years old (adjusted odds ratio 0.8; 95% CI 0.4, 1.8).

***CONCLUSIONS:*** Nearly two-thirds of caregivers with their child in the ED for fever have low health literacy. Caregiver low health literacy is associated with nonurgent ED utilization for fever in children over 2 years of age. Future interventions could target health literacy skills regarding fever in caregivers of children ≥2 years.

**KEYWORDS:** child; preschool; emergency service; hospital; health literacy; health services accessibility; infant; nonurgent emergency care use; utilization

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## WHAT'S NEW

Over two-thirds of caregivers who bring their child to the emergency department for fever have low health literacy, which is related to higher odds of a nonurgent visit in children aged ≥2 years. We found that health literacy is an important factor in care-seeking behavior for mild acute illnesses such as fever.

LOW HEALTH LITERACY, which is a significant national problem, is found in over half of caregivers seeking care with their child at the emergency department (ED).[1,2] Adults with low health literacy lack the skills in understanding disease process, care knowledge, and health-related decision making.[3] Specific to ED use, adults with low health literacy have poor health system navigation, leading to difficulty accessing the health system.[3] This may be particularly problematic for parents with low health literacy when their child has an acute illness. In a previous study, we found children of caregivers with low health literacy have higher odds of a nonurgent visit.[1] In particular, children without a chronic illness have 3 times the odds of a nonurgent visit if the caregiver has low health literacy. As suggested by previous research,[1,4] times when children require more than usual care, such as an acute illness (eg, gastroenteritis, viral upper respiratory infection, or fever), in otherwise healthy children prompts nonurgent ED visits by caregivers with low health literacy. However, no previous study has addressed a specific acute disease state, such as fever, to understand how health literacy impacts nonurgent ED use.

A lack of health literacy skills, specifically in the setting of a child with fever, could lead to more nonurgent ED visits, given the history of so-called fever phobia described

in caregivers of children.[5] Fever provokes fear in parents, who have a common misperception of the danger of fever (eg, death or brain damage).[5–7] Fever represents a common self-limited illness, but it requires caregivers to assess and understand the significance of their child's temperature and treat the fever correctly through dosing antipyretic medications, both of which are difficult for caregivers with low health literacy.[3,8–10] Low educational attainment is related to increased ED use for fever, supporting the notion that low health literacy may increase nonurgent visits for fever.[7]

We examined the relationship between low health literacy and nonurgent ED use in caregivers of children seeking care at the ED for fever. We hypothesized that in caregivers with low health literacy, children presenting to the ED for fever would be more likely to be classified as nonurgent.

## METHODS

### STUDY PARTICIPANTS

This cross-sectional study assessed caregivers accompanying children 57 days old to 12 years old with a complaint of fever presenting to the pediatric ED. Research assistants (RAs) enrolled patients during 2 periods, 8 summer weeks (June to July 2011, 80 shifts, 182 participants) and 10 winter weeks (January to March 2012, 32 shifts, 134 participants), to account for seasonal variation of pediatric illness. Subjects were excluded if they previously completed the study, if they did not speak English or Spanish, if the child was in acute distress (eg, highest acuity triage level), or if the child had a condition for which fever is always urgent and testing is required (eg, central line, neutropenic condition, sickle cell disease, or infant <57 days old[11]). We enrolled participants separately from our previous study.[1] Institutional review board approval was obtained.

Trained RAs enrolled consecutive subjects during 4-hour predefined study blocks during daytime, evening, and weekend hours. The RAs attempted to approach all caregivers with children seeking care for fever during the enrollment period. After verbal consent was obtained using a script written at the 5th grade level, the RAs orally administered the Newest Vital Sign (NVS)[12] to assess health literacy and the Children With Special Health Care Needs[13] questionnaire to determine child chronic illness status. Caregivers completed a self-administered survey of sociodemographic information.

### MEASURES

#### *HEALTH LITERACY*

The NVS is a validated 6-question test administered to assess health literacy and numeracy as a composite score.[12] The RA gave the caregiver a nutrition facts label to answer health-related questions including performance of calculations. Resulting NVS scores were dichotomized into low (0 to 4 questions correct) and adequate (5 to 6 questions correct) health literacy categories using the threshold from a previous study.[1]

#### *NONURGENT VISIT CLASSIFICATION BASED ON RESOURCES USED*

The urgency of the ED visit was classified on the basis of resources used during the ED visit,[14,15] a method used in other studies of ED utilization.[16,17] The RAs performed a blinded chart review to determine the resources used during the ED visit. Visits were considered urgent if the child utilized any diagnostic testing (excluding rapid strep and viral antigen swabs), radiologic studies, administration of intravenous fluids, or provision of any medication (excluding oral antibiotics and over-the-counter medications).[14] All other visits were considered nonurgent. Fever was not a criterion for determining visit urgency.

### STATISTICAL ANALYSES

We performed chi-square analysis to compare demographic characteristics and health literacy with urgency of the ED visit. We stratified analyses by child age as planned a priori as a result of a known higher nonurgent ED use in children <2 years old.[18] We performed logistic regression, adjusted for race, for the age stratification by including a combined health literacy (low or adequate) and child age (<2 years, ≥2 years) variable using 2 regression models to obtain the specific referent group. Additionally, we stratified findings by race to further understand the findings in bivariate analysis. Study data were collected and managed using REDCap electronic data capture tools. SAS software, version 9.3 (SAS Institute, Cary, NC), was used for all statistical analyses.

A sample size of 283 caregiver–child pairs would detect a minimum difference of 0.15 in nonurgent ED visit proportion between adequate and low health literacy with an $\alpha$ of 0.05 and power of 0.80.

## RESULTS

A total of 476 caregiver–child pairs were eligible for enrollment, 316 consented (66%), and 299 completed all study materials (Fig. 1). Children had a median age of 2.0 years, and 34% had a chronic illness (Table 1). Sixty-three percent of the caregivers had low health literacy (95% confidence interval [CI] 58, 68). Low health literacy was associated with lower caregiver educational attainment, minority race/ethnicity, and a higher proportion of publically insured children ($P < .01$ for all variables).

### NONURGENT ED VISITS

Analysis of resources utilized showed that 39% of the ED visits for fever were nonurgent. Low health literacy was associated with a higher proportion of nonurgent ED visits (44% vs 31%; odds ratio [OR] 1.8; 95% CI 1.1, 2.9). Caregiver black race and public insurance were also related to nonurgent ED use in unadjusted analyses (Table 2).

### EFFECT OF LOW HEALTH LITERACY ON NONURGENT ED VISITS BY CHILD AGE

The proportion of nonurgent ED visits in children of caregivers with low health literacy differed by age