



Original article

Use of a tick-borne disease manual increases accuracy of tick identification among primary care providers in Lyme disease endemic areas



Amber D. Butler^{a,*}, Meredith L. Carlson^b, Christina A. Nelson^c

^a Department of Research and Innovation, Danbury Hospital, 24 Hospital Avenue, Danbury, CT 06810, United States

^b Physician Assistant Department, Drexel University, 1601 Cherry Street, Philadelphia, PA 19102, United States

^c Division of Vector-Borne Diseases, Centers for Disease Control and Prevention, 3156 Rampart Road, Fort Collins, CO 80521, United States

ARTICLE INFO

Article history:

Received 10 August 2016

Received in revised form

21 November 2016

Accepted 22 November 2016

Available online 23 November 2016

Keywords:

Lyme disease

Tick-borne disease

Tick identification

ABSTRACT

Given the high incidence of tick bites and tick-borne diseases in the United States, it is important for primary care providers to recognize common ticks and the pathogens they may transmit. If a patient has removed and saved an attached tick, identifying the tick helps guide clinical management and determine whether antibiotic prophylaxis for Lyme disease is appropriate. To investigate providers' ability to recognize common ticks and the pathogens they may transmit, we asked 76 primary care providers from Lyme disease endemic areas to identify the common name or genus of preserved ticks found in their area. At baseline, 10.5%, 46.1%, and 57.9% of participants correctly identified an adult female blacklegged tick (engorged), dog tick, and lone star tick, respectively. Less than half of participants identified the three pathogens most frequently transmitted by blacklegged ticks. Use of a reference manual with tick photographs and drawings substantially improved identification of ticks and associated pathogens and therefore should be encouraged in clinical practice.

© 2016 Elsevier GmbH. All rights reserved.

1. Introduction

Tick-borne diseases (TBD) present a major public health problem in the United States, where 74.7% of clinicians in high-incidence states report having treated a patient for TBD in the previous year (Brett et al., 2014). In the United States, more than a dozen pathogens can be transmitted by five different genera of ticks (Shah and Sood, 2013). When a primary care provider sees a patient who has removed and saved an attached tick, it is important to identify the tick genus or common name to determine which pathogens were potentially transmitted and whether antibiotic prophylaxis for Lyme disease is appropriate. Some 41.1% of providers in states with high Lyme disease incidence recently reported providing tick-bite prophylaxis in the previous year (Brett et al., 2014). Notably, misidentification of a tick may lead to unnecessary prophylactic

antibiotic treatment, unwarranted testing, or potentially a missed diagnosis of TBD.

To date, only one study has been published on tick identification by providers in a Lyme disease endemic area (Falco et al., 1998). This study examined specimens submitted by physicians or medical groups to the Fordham University Vector Ecology Laboratory in Westchester County, NY between 1988 and 1990 for tick identification. Among 802 submitted specimens, 74.7% were blacklegged ticks (*Ixodes scapularis*). It is unclear, however, whether all of these specimens were initially suspected to have been blacklegged ticks and thus whether the remaining 25.3% were incorrectly identified. Notably, 5.9% of specimens submitted for tick identification were non-tick arthropods including beetles, crab lice, and head lice. It is also unknown how well this sample represents tick identification by providers during regular clinical practice and not as part of a tick identification service.

A variety of educational materials have been created recently to aid clinicians, public health practitioners, and the public in identifying ticks and the pathogens they might carry (Centers for Disease Control and Prevention, 2015b; University of Rhode Island TickEncounter Resource Center, 2016). To our knowledge, the effectiveness of these materials in improving tick identification and

Abbreviations: CDC, Centers for Disease Control and Prevention; TBD, tick-borne disease.

* Corresponding author.

E-mail addresses: amber.butler@wchn.org (A.D. Butler), mcarlson318@gmail.com (M.L. Carlson), wje1@cdc.gov (C.A. Nelson).

<http://dx.doi.org/10.1016/j.ttbdis.2016.11.010>

1877-959X/© 2016 Elsevier GmbH. All rights reserved.

knowledge of potentially transmitted pathogens has not been evaluated.

The objectives of this study were to determine the ability of primary care providers to identify common ticks, assess provider knowledge of pathogens transmitted by these ticks, and investigate whether use of a TBD reference manual with photographs and drawings of ticks could improve identification.

2. Material and methods

We recruited a convenience sample of primary care providers from Lyme disease endemic states (Connecticut, Pennsylvania, Delaware, New York, and Massachusetts) through a variety of venues. Primary care providers affiliated with one hospital network spanning parts of Connecticut and New York were recruited via e-mail then completed the study via an in-office visit by an investigator. The Family Medicine and Pediatrics residency programs of two additional hospitals in Connecticut participated in this study in conjunction with a TBD education session provided after study completion. Participants from Pennsylvania, Delaware, and Massachusetts were recruited at professional conferences and continuing medical education events. Participants answered basic questions about their clinical specialty, level of training, and resources typically used to identify a tick that has been removed from a patient.

Participants viewed seven vials, each containing one to three of the following ticks typically present in the study area, preserved in ethanol: nymphal, adult male, adult female, and engorged adult blacklegged tick; adult male and female American dog tick (*Dermacentor variabilis*); and adult female lone star tick (*Amblyomma americanum*). Using a multiple-choice questionnaire, participants were asked individually to identify the common name of each specimen and the pathogens transmitted by each type of tick. Participants were aware that the study was about tick identification but were not told that each specimen was indeed a tick. Participants were given unlimited time to view each vial but were not permitted to remove the ticks from the vials. Magnifying aids were not made available as part of the study, but participants were instructed to use any resources they normally would consult in a clinical setting.

Response options for common names of ticks included: a) blacklegged tick (deer tick), b) lone star tick, c) American dog tick, d) this is not a tick, or e) I don't know. Response options for pathogens transmitted by a given tick were a) anaplasmosis, b) babesiosis, c) ehrlichiosis, d) Lyme disease, e) Rocky Mountain spotted fever, f) Southern tick-associated rash illness (STARI), g) tularemia, and h) I don't know. Because anaplasmosis was formerly known as human granulocytic ehrlichiosis and the first-line treatment for adults and children of all ages for both anaplasmosis (transmitted by the blacklegged tick) and ehrlichiosis (transmitted by the lone star tick) is doxycycline, respondents were not faulted if they indicated that ehrlichiosis was transmitted by the blacklegged tick. As such, participants were counted as having correctly identified the diseases transmitted by blacklegged ticks if they selected: 1) Lyme disease, 2) babesiosis, and 3) anaplasmosis and/or ehrlichiosis and did not select Rocky Mountain spotted fever, Southern tick-associated rash illness, or tularemia.

After completing the questionnaire, participants then repeated identification of ticks and the pathogens they transmit using a reference manual, "Tickborne Diseases of the United States", containing photographs, drawings, and descriptions of ticks (Centers for Disease Control and Prevention, 2015b). Participants also were asked whether the manual was helpful and whether they would use it if available in their office.

This study was deemed exempt from review by the Biomedical Research Alliance of New York Institutional Review Board.

Table 1

Characteristics of 76 primary care providers who participated in the study.

	N (%)
Specialty	
Family Medicine	30 (39.5)
Pediatrics	27 (35.5)
Internal Medicine	15 (19.7)
Internal Medicine-Pediatrics	4 (5.3)
Provider level	
Medical Resident	30 (39.5)
Physician	20 (26.3)
Physician Assistant	20 (26.3)
Advanced Practice Registered Nurse	6 (7.9)
Reported approach to identifying ticks in medical practice ^a	
Use online references	25 (34.7)
Identify based on own knowledge	16 (22.2)
Consult colleagues for help identifying	16 (22.2)
Do not try to identify	10 (13.9)
Consult local health department	4 (5.6)
Use paper references	3 (4.2)

^a Multiple selections were permitted for this question. Thirteen respondents (9 residents and 8 physician assistants) reported that they had never had a patient bring in or describe a tick.

3. Results

Seventy-six primary care providers participated in the study; the most common participant specialties were family medicine (39.5%) and pediatrics (35.5%) (Table 1). While 34.7% of respondents reported using online references to aid in tick identification, 22.2% reported that they relied on their current knowledge without consulting external resources. Ten respondents (13.9%) reported that they do not attempt to identify ticks in clinical practice.

Overall, only 10.5% of participants correctly identified the engorged adult female blacklegged tick, and 30.3% thought it was not a tick (Table 2). With the manual, correct identification increased six-fold. Correct identification of blacklegged adult females (48.7%), adult males (61.8%), and nymphs (69.7%) was better at baseline than for the engorged blacklegged tick and increased to 67–74% with the manual. At baseline, 46.1% of providers correctly identified female dog ticks; this increased to 69.7% with the manual. Likewise, identification of female lone star ticks increased from 57.9% to 88.2% with the manual.

Nearly half (48.0%) of participants identified the three pathogens most frequently transmitted by blacklegged ticks, and this increased to 89.2% with use of the manual. Just 7.1% of participants recognized the diseases transmitted by American dog ticks; however, this improved to 98.7% when using the manual. Similarly, only 4.1% identified the diseases transmitted by lone star ticks; this increased to 74.7% with the manual.

All participants responded that the manual was helpful and 98.6% reported they would use it if available in the office. Of those who indicated a preference, 60% of participants favored use of an electronic copy of the manual, while 40% preferred a paper booklet, such as the version used in this study.

4. Discussion

In this study, identification of common ticks by primary care providers in areas endemic for Lyme and other TBD was highly variable at baseline but improved substantially with use of a visual reference manual. In particular, just 10.5% of participants correctly identified the engorged female blacklegged tick and 30.3% believed it was not a tick. This is concerning given that patients in Lyme-endemic areas with a blacklegged tick that has fed to repletion are most likely to have acquired an infection (des Vignes et al., 2001; Katavolos et al., 1998; Piesman and Dolan, 2002) and would

Download English Version:

<https://daneshyari.com/en/article/5546477>

Download Persian Version:

<https://daneshyari.com/article/5546477>

[Daneshyari.com](https://daneshyari.com)