Epidemiology and Clinical Presentation of Community-Acquired Diarrhea in Infants and Young Children in the United States: The National Pediatric Diarrhea Surveillance Study

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ABSTRACT

Epidemiology and Clinical Presentation of Community-Acquired Diarrhea in Infants and Young Children in the United States: The National Pediatric Diarrhea Surveillance Study

To define the epidemiology and clinical presentation of community-acquired diarrhea in young U.S. children.

Objective:

Healthy children 6-36 months old were enrolled by their primary care physicians and followed for 6 months. All episodes of diarrhea (defined as a change in stool pattern with more frequent and/or more watery stools) were ascertained. Detailed interviews were conducted every two months and after each diarrhea episode.

Results:

1.23-2.28). The median duration of episodes was 2.0 days (range 1-64) and the median number of stools per episode was 6.0 (range 1-TNTC). 89.9% of episodes were acute (<14 days), 8.2% (16.7%), mucus in the stool (16.3%), and blood in the stool (0.8%). A physician was consulted in 8.2% of acute episodes and 28.0% of persistent episodes. Hospitalization occurred in 0.3%. Of those who stated they were more than 14 days, only 8% of episodes were persistent with a median duration of 22 days. In the denominator, diarrhea was defined as "change in bowel habits involving more frequent and/or more watery stools.

BACKGROUND

Diarrhea is a common symptom of illness in childhood

Diarrhea is common in young children, but little is known about its entire clinical spectrum, particularly mild cases that do not require medical care.

METHODS

NATIONAL PEDIATRIC DIARRHEA SURVEILLANCE STUDY

Prospective cohort study

Subjects recruited and enrolled by SCOR network primary care physicians throughout the U.S.

Inclusion criteria: healthy children ages 6-36 months without history of intestinal malabsorption, BD, CF

Active surveillance for all episodes of diarrhea during 6-month study period

Diarrhea defined as "change in bowel habits involving more frequent and/or more watery stools.

For each diarrhea episode, interview conducted and stool specimen obtained

SCOR NETWORK

National office-based research network of pediatricians and family practitioners administered by Slone Epidemiology Center at Boston University

Currently 479 participating physicians

Participation projects include:

• Boston University Fever Study (RCT of safety of ibuprofen for children)
• Study of NSAI and invasive Group A Streptococcal infections complicating varicella (case-control study)
• National Pediatric Diarrhea Surveillance Study (cohort study)
• Rickettsia for prevention of acute otitis media (pilot RCT)

RESULTS

TABLE 1: CHARACTERISTICS OF 604 STUDY SUBJECTS

| Age in months, Mean (SD) | 15.2 (7.5) |
| Sex, No. (%) | Female 287 (47.5) | Male 317 (52.5) |
| Geographical region, No. (%) | New England 45 (7.5) | Mid-Atlantic 123 (20.2) | South 132 (21.9) | Midwest 200 (33.1) | Southwest 57 (9.4) | West 48 (7.9) |
| Community type, No. (%) | Urban 157 (26.0) | Suburban 294 (48.7) | Rural 148 (24.5) |
| Education of most educated parent, No. (%) | Unknown 5 (0.8) | High school or less 134 (22.2) | Some college 154 (25.5) | College graduate 259 (43.0) |
| Annual household income, No. (%) | Less than $10,000 44 (7.3) | $16,000-34,999 133 (22.0) | $35,000-54,999 149 (24.7) | $55,000 or more 245 (40.6) | Unknown 33 (5.5) |

TABLE 2: CHARACTERISTICS OF DIARRHEA EPISODES

| No. (%) | All reported diarrhea episodes | 611 (100.0) | Acute diarrhea (>14 days) | 540 (89.9) | Persistent diarrhea (≤14 days) | 50 (8.2) | Unknown duration | 12 (2.0) |
| Episodes per person-year | 2.21 |
| Median duration of episodes in days (range 1-64) | 3.0 (1.0-4.0) |
| Median number of stools per episode (14 days) | 6.0 (3.0-12.0) |
| Associated signs and symptoms, No. (%) | Loss of appetite 284 (51.7) | Cold symptoms 232 (43.9) | Vomiting 228 (41.5) | Fever 145 (26.4) | Abdominal pain 146 (26.4) | Diarrhea prior to onset of symptoms 4 (0.7) |
| Medications given, No. (%) | Probiotics 118 (21.5) | Antidiarrheal medication 102 (18.8) | Antibiotics 93 (16.7) | Electrolyte solution 98 (17.5) | Bismuth subsalicylate 53 (9.4) | Loperamide 51 (9.2) |
| Medical care received, No. (%) | Probiotics 118 (21.5) | Antibiotics 93 (16.7) | Electrolyte solution 98 (17.5) | Bismuth subsalicylate 53 (9.4) | Loperamide 51 (9.2) |

TABLE 3: CHARACTERISTICS OF DIARRHEA EPISODES

| No. (%) | Acute Episodes | Persistent Episodes | p (acute vs. persistent) |
| Episodes per person-year | 2.0 (1.0-4.0) | 4.0 (1.0-4.0) | 0.000061 |
| Median number of stools per episode (14 days) | 3.0 (1.0-4.0) | 6.0 (3.0-12.0) | 0.001264 |
| Associated signs and symptoms, No. (%) | Loss of appetite 284 (51.7) | 252 (42.9) | 0.068227 |
| Medications given, No. (%) | Probiotics 118 (21.5) | 135 (22.8) | 0.380019 |
| Medical care received, No. (%) | Probiotics 118 (21.5) | 148 (25.2) | 0.000042 |

CONCLUSIONS

Infants and young children in the U.S. experience just over two episodes of diarrhea per child per year.

Most episodes are acute with a median duration of two days; however, approximately 8% of episodes are persistent with a median duration of 22 days.

There is a very low rate of medication use for treating diarrhea in this age group; however, approximately 8% of episodes are persistent with a median duration of 22 days.

Only 10% of diarrhea episodes result in an outpatient medical visit and hospitalization occurs in approximately 3 cases per 1000.

Diarrhea is common throughout the year with small peaks occurring in winter and summer and relatively lower incidence in the fall.

Visual Abstract

ABSTRACT

Background: Diarrhea is common in young children, but little is known about its entire clinical spectrum, particularly mild cases that do not require medical care.

Design/Methods: Subjective cohort study using monthly interviews and stool specimens of community-acquired diarrhea in young children.

Results: 604 children from 36 states were enrolled. Successive follow-up at 1, 2, 4, and 6 months was 97.3%, 96.4%, and 96.4%, respectively. The overall incidence of diarrhea was 2.21 episodes per person-year, with the highest incidence in January (2.49 95% CI 2.32-2.66) and August (2.71 95% CI 2.53-2.90) and the lowest in November (1.68 95% CI 1.54-1.84) and December (1.67 95% CI 1.51-1.84). The median duration of episodes was 2.0 days (range 1-64) and the median number of stools per episode was 6.0 (range 1-24). 89.9% of episodes were acute (<14 days), 8.2% (16.7%) mucus in the stool (16.3%), and blood in the stool (0.8%). A physician was consulted in 8.2% of acute episodes and 28.0% of persistent episodes. Hospitalization occurred in 0.3%. Of those who stated their episode was persistent, one or more days was missed in 25.5% of episodes. Antibiotic treatment included one or more lactobacillus (15.3%), bismuth subsalicylate (29.3%), loperamide (39.7%), and probiotics (15.7%). Use of herbal products was reported.

Conclusions: Infants and young children in the U.S. experience on average, over two episodes of diarrhea per year. Most episodes are of brief duration and mild severity and do not result in contact with the medical system. Medication use is infrequent. Oral electrolyte solution is the most commonly administered treatment, used in approximately in one-tenth of cases. About 8% of episodes last longer than 14 days and these persistent episodes result in higher health care utilization.