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BRIEF REPORT

Quality of Care for Young Febrile Infants Varied Widely Among Spanish Paediatric Emergency Departments

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There have been substantial variations in the care of febrile young infants [1, 2]. In 2021, our multicentre study established 20 quality indicators (QIs) for managing infants under 3 months old with fever without a source [3].

This latest study aimed to analyse care quality and variations when febrile infants under 3 months presented to Spanish emergency departments (EDs). We hypothesised that there would be significant care variations and that the knowledge translation, from research to implementation, could be associated with these.

The first step was to design a web-based survey that presented four clinical scenarios to clinical decision makers, who were attending paediatric physicians and residents in 26 EDs. These were members of the Spanish Paediatric Emergency Research Network and worked at secondary and tertiary hospitals, paediatric and general hospitals and centres serving small and large patient numbers. Their knowledge of the recommendations on managing febrile young infants was assessed using previously published QIs. Then, we conducted a retrospective multicentre study in 24 of the 26 EDs of febrile infants under 3 months seen between May 2022 and April 2023. Specific electronic questionnaires were completed online for all patients, including data from electronic records. We analysed how well the 24 hospitals complied with the QIs and also focused on variations among the 13/24 hospitals who had managed at least 50 febrile infants. The study was approved by the Clinical Research Ethics Committee of the Basque Country and the institutional review boards of each participating institution. The clinicians provided informed consent by taking part.

The link to the clinical scenarios was sent to 841 physicians in 26 EDs and it was completed by 80.0%. Of these, 29.3% were emergency paediatricians, 23.0% were paediatricians from other areas working in the ED and 47.7% were paediatric residents. The survey yielded 20 863 responses to the 31 items and 88.1% were correct. There were few differences between the three professional groups, but there were wide variations between the hospitals, ranging from 78.9% to 98.7% correct responses.

The retrospective study comprised 1714 patients from 24/26 EDs, with a median age of 50 days. We found that 31 (1.8%) were diagnosed with an invasive bacterial infection. Of those 315 (18.4%) tested positive for the severe acute respiratory syndrome coronavirus 2 and compliance with care standards was lower in these patients than in the rest of the sample. When they were excluded, compliance with the QIs was significantly lower in clinical practice than in the clinical scenarios (Table 1).

Despite good knowledge among the three groups of clinicians, there were wide variations in quality of care between the hospitals. Testing, treatment and hospitalisation varied widely by hospital, including essential QIs, as reported in the USA [2]. Some differences were trivial, but others were worrying. For example,

Abbreviations: ED, emergency department; QIs, quality indicators.

TABLE 1 | Compliance with quality indicators for young febrile infants in clinical scenarios and clinical practice.

Febrile infants at various days of age	Clinical scenarios %[a]	Clinical practice %[b]	*p*
Essential care elements provided			
Management protocol for infants ≤90 days old	97.3 (57–100)		
≤90 days, screened for leukocyturia/nitrituria	98.7 (78–100)	94 (92.6–95.1)	<0.01
≤90 days, underwent blood cultures[c]	93.1 (78.5–100)	83.8 (81.8–85.7)	<0.01
≤90 days, received antibiotic therapy if appeared unwell	82.8 (42–100)	62 (48.2–74.1)	<0.01
All infants (*n* = 1714)			
≤90 days, had record of appearance on arrival at ED	99.4 (95–100)	99.9 (99.4–99.9)	ns
≤90 days, had rectal temperature measurement	99.3 (92–100)	48.6 (46–51.2)	<0.01
≤90 days, underwent urine culture[d]	99 (98.1–99.6)	89.5 (87.8–91)	<0.01
22–90 days, blood PCR for enterovirus in epidemic season	19 (0–100)	26.7 (24.5–29.1)	0.01
≤90 days, rapid diagnostic test for influenza in epidemic season	87.4 (18–100)	94.4 (93–95.4)	<0.01
Infants who appeared unwell (*n* = 61)			
≤90 days, underwent lumbar puncture	76.7 (0–100)	36 (24.1–50)	<0.01
Infants less than 21 days old (*n* = 265)			
Underwent lumbar puncture	77.5 (0–100)	56.4 (50.1–62.5)	<0.01
Received antibiotic therapy	61 (0–100)	59.3 (53–65.3)	ns
Admitted to ward/intensive care unit	92 (78–100)	90.5 (86.1–93.6)	ns
Other groups			
22–28 days, abnormal biomarkers and lumbar punctures (*n* = 23)	94.8 (32–100)	25.3 (21.5–29.6)	<0.01
22–90 days, with blood biomarker levels (*n* = 1449)	96.5 (77–100)	89.6 (87.5–90.7)	<0.01
22–90 days, appeared well with normal urine dipstick, altered blood biomarkers, antibiotic therapy (*n* = 455)	98.5 (92–100)	63.6 (58–69)	<0.01
≤90 days, suspected urinary tract infection, and antibiotic therapy (*n* = 314)	90.6 (50–100)	49.8 (43.5–56.1)	<0.01
22–90 days, with normal urine dipstick, pleocytosis and antibiotic therapy (*n* = 83)	92 (85–100)	83.3 (74.8–90.5)	<0.01
≤90 days, with low-risk criteria and no antibiotic therapy (*n* = 866)	93.3 (88–100)	87.3 (85.4–88.9)	<0.01
22–90 days, with pleocytosis, admitted to ward or ICU unit (*n* = 83)	97.6 (86–100)	98.8 (93.4–99.8)	0.04

Abbreviations: ICU, intensive care unit; ns, not significant; PCR, polymerase chain reaction.
[a]Minimum and maximum of correct response rate or adequate management: Second-phase hospital-level variations for all hospitals.
[b]Minimum and maximum of correct response rate or adequate management: Third-phase hospital-level variations for 13/24 hospitals with at least 50 infants.
[c]Minimum and maximum of correct response rate or adequate management: Rates of blood cultures obtained varied: 94.5% for <28 days old, 79.3% for 29–60 days and 67.2% for >60 days old ($p < 0.01$).
[d]Minimum and maximum of correct response rate or adequate management: Urine culture recommended for infants with fever without a source: all infants ≤90 days old before antibiotics, all infants ≤21 days old and infants 22–90 days old with altered urine dipsticks.

in the clinical scenarios, around 80% said that they would administer antibiotics to infants who appeared unwell without waiting for their test results. In the retrospective study, less than 60% did this. In fact, most of the QIs showed lower adherence in clinical practice than in the clinical scenarios.

Our findings require careful analysis and underline the importance of research on knowledge translation [4], which addresses the gap between what we know and what we do in clinical practice. The optimal management of febrile infants who tested positive for the pandemic virus was particularly challenging.

QIs can change over time. For example, blood cultures are now recommended for febrile infants under 60 days old [5]. Paediatric societies should monitor updated guidelines and make sure that their members receive new information. In addition, some QIs should be cautiously considered. For example, providing lumbar punctures for infants who appear unwell could be contraindicated, as their presentation might indicate clinical instability.

Our study had some limitations, including the small number of cases in some hospitals. Caution should be exercised in applying our conclusions to those centres. Despite this, our study

enabled us to achieve our main objective, which was to analyse care variations in Spanish EDs. We excluded febrile infants who tested positive for the pandemic virus, as there were no validated recommendations for them. Although the response rate to the survey was 80.0%, the non-responders could have provided further practice variations. Finally, using retrospective data is a known limitation, but it was the best method for this research, as respondents provided factual rather than desirable answers.

Research is needed to analyse the reasons for the wide variations in the quality of care provided for young febrile infants in Spanish EDs in different hospitals, particularly the role of knowledge translation.

Author Contributions

Ainara Lejarzegi: conceptualization, investigation, writing – original draft, methodology, writing – review and editing, formal analysis, data curation. **Roberto Velasco:** conceptualization, investigation, writing – original draft, methodology, writing – review and editing. **David Andina:** conceptualization, investigation, writing – original draft, methodology, writing – review and editing. **Borja Gómez:** conceptualization, investigation, writing – original draft, methodology, writing – review and editing. **Santiago Mintegi:** conceptualization, investigation, writing – original draft, methodology, writing – review and editing, formal analysis, supervision.

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Conflicts of Interest

The authors declare no conflicts of interest.

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