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Urinary tract infections in young children: high guideline adherence of triage nurses at general practice co-operatives

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ABSTRACT

Background Urinary tract infection (UTI) is one of the most common bacterial infections among children, and it can have serious consequences including renal failure. Triage nurses at general practice (GP) co-operatives play an important role in identifying UTI in young children, but diagnosis is difficult because the symptoms tend to be non-specific.

Aim The aim of this study was to determine what triage nurses at GP co-operatives do when UTI in a child is suspected, or when a feverish child is presented.

Methods A survey study of triage nurses at Dutch GP co-operatives based on four vignettes was carried out. The information in the vignettes consisted of data about one 5-year-old child with suspected UTI, and three children with fever without focus (a 14-month-old boy with a 3-day fever, a 2-month-old girl with a 2-day fever, and a 4-year-old child with a 5-day fever).

Results A total of 145 questionnaires (59% response rate) were returned. If UTI was suspected, all triage nurses requested the parents to provide a sample of the child's urine, but only 70% gave instructions on how to collect the urine. More than 90% of the triage nurses requested the feverish children aged 2 months and 4 years to appear at the GP co-operative. Eighty per cent also requested the 14-month-old boy with fever without focus to appear, even though there was no direct need for this request. In most cases, the triage nurses did not think UTI was likely, mainly because they thought another focus was more likely.

Discussion More than 90% of triage nurses at GP co-operatives acted according to the guidelines if UTI was suspected. Even though UTI was not the first focus a triage nurse thought of when a child with fever without focus was presented, she requested the child to be brought to the GP co-operative almost every time. Possible interventions to improve the detection of children's UTIs could focus on the importance of the timeliness of detection, while over-diagnosis should be prevented.

Keywords: child, GP co-operative, primary health care, quality of health care, urinary tract infections

Introduction

The incidence of urinary tract infections (UTIs), one of the most common kinds of bacterial infections among children, is 2.6% for girls and 0.5% for boys in the 1- to 4-year-old group in general practice.[1] Diagnosing UTI in young children is difficult because most of their complaints are non-specific, like failure to thrive, vomiting and fever.[2] Four to five percent of feverish children have UTI.[3,4] Without timely treatment, renal scarring can occur, which can lead to hypertension, complications during pregnancy, and renal failure.[5] UTIs are likely to cause renal scarring in 5–15% of young children, particularly those less than 1 year old. Children older than 5 years hardly ever suffer renal scarring caused by UTIs.[6–8] Thus, the challenge is to detect and treat UTIs in young children appropriately, while avoiding over-diagnosis and over-treatment.

In The Netherlands, the first contact with a healthcare provider is almost always in general practice (GP).[9] Out-of-hours GP care is provided by GP co-operatives, established mainly about the millennium.[10] A patient's first contact with the GP co-operative is usually with a triage nurse by telephone. Triage nurses determine the level and urgency of care needed to address the health issue and give advice in non-urgent cases. They use the *Telephone Triage Guide*, developed by the Dutch College of General Practitioners, which gives information on what questions to ask, what advice to give, and which situations are cases of emergency, urgency, or routine.[11] Triage nurses on the alert for UTIs in children can initiate timely treatment, so that fewer renal scars will occur.

The aim of this study was to determine what triage nurses at GP co-operatives do when a child with a suspected UTI or a feverish child is presented.

Methods

Participants

The study participants were triage nurses working at GP co-operatives. All 117 Dutch GP co-operatives were telephoned or emailed. Altogether, 247 questionnaires were sent to 54 GP co-operatives (approximately 3–5 per GP co-operative). The remaining GP co-operatives declined to participate or did not respond. Reminders were sent to GP co-operatives that had returned fewer than 65% of their questionnaires 1–2 months after the mailing.

Questionnaire

We constructed four vignettes (see Box 1) on the basis of the *Telephone Triage Guide* and two national guidelines on UTIs and feverish children.[12–13] The guidelines are clear about whether a child must be seen at the GP co-operative. For example, feverish children younger than 3 months (vignette 3) must be seen by a GP anyway, but this is not recommended for a child older than 3 months with fewer than 4 days of fever and no other symptoms (vignette 2). The vignette information consisted of only a few patient characteristics, in which age, sex, and duration of fever varied according to the various guideline decision points.

Structured questions with pre-specified answers asked for background information such as sex, background profession, knowing and using the *Telephone Triage Guide*, and questions to assess routines. The questions about vignette 1 focused on the complaints perceived as being associated with UTIs, the questions to be asked, the decision whether to see the child, the advice and instructions to be given (e.g. when to call again), to provide a urine sample if the child was to be seen and advice about how to collect the urine. The

Box 1 Vignettes

Vignette 1
A parent of a 5-year-old child calls the GP co-operative. The child has some non-specific complaints, but is not seriously ill. The child has no previous medical history. You think it might be a urinary tract infection.

Vignette 2
On Saturday at 9.30 am, a worried mother calls the GP co-operative: her 14-month-old son has a fever (40°C) for the third day. According to the mother, the child does not look very ill and does not have any serious symptoms.

Vignette 3
On a Wednesday at 11 pm a father calls about his 2-month-old daughter. She has a fever of 40°C for the second day.

Vignette 4
A mother calls about her 4-year-old child on Sunday afternoon. Her child has had a fever for 5 days now.

questions about vignettes 2, 3, and 4 focused primarily on the estimation of whether a UTI was likely and why. Another question concerned the decision whether to see the child at the GP co-operative, and if not, whether advice was given on when to call again.

The questionnaire was tested on three GP nurses and eight GPs.

Analyses

The differences between participating and non-participating GP co-operatives and responding and non-responding GP co-operatives were calculated with independent samples *t* tests ($P < 0.05$) on the number of years since the GP co-operative was founded, number of GP co-operatives within the organisation, total number of inhabitants in the catchment areas, degree of triage (e.g. who does the triage, which method is used) and degree of working according to protocols. These data were obtained from a study of the Dutch Health Care Inspectorate on GP co-operatives.[10] No data were available on individual non-responding triage nurses.

Questionnaire data were entered into the computer programme Access 2000, and analysed with the statistical computer programs SAS 8.2 for Windows and SPSS 12.1. Frequencies were calculated for the background variables sex, background profession, knowing and using the *Telephone Triage Guide*, and the questions about the four vignettes. Means and standard deviations were calculated for the variables: years of working experience in the background profession and at the GP co-operative, and number of days a week working at the GP co-operative.

Results

Response

Of 247 questionnaires, 145 were returned (59%). No differences were found between the participating and non-participating GP co-operatives and the responding and non-responding GP co-operatives.

Respondents

Table 1 presents the characteristics of the triage nurses. All respondents but one were women. Most triage nurses had a background as a GP nurse or hospital nurse. Almost all triage nurses said they knew the *Telephone Triage Guide*, and most said they used it.

The child with suspected UTI

Table 2 shows that most nurses thought that abdominal pain, fever, flank pain, general malaise, and incontinence are related to UTI, as well as the more typical symptoms like haematuria, dysury, pollakiuria, and strangury. Complaints like diarrhoea, vomiting, and delayed height growth were not frequently associated with UTI (<25% thought so). The non-specific symptoms most relevant to UTIs in children were perceived to be abdominal pain, fever, flank pain, and general malaise.

If parents called about their child (vignette 1), the triage nurses wanted to know the duration (94%) and seriousness (74%) of the symptoms and what parents themselves thought about the complaints (85%). Some triage nurses also asked about the sex, age, and medical history of the child.

Table 1 Respondent characteristics (*n* = 145)

Characteristic	
Sex (% women)	99
Background profession (%)	
GP	79
nurse	21
Mean (SD) number of years of working experience in background profession	14.1 (7.8)
Mean (SD) number of years of working experience at the GP co-operative	2.5 (0.9)
Mean (SD) number of days a week working at the GP co-operative	2.0 (1.0)
Telephone Triage Guide (%)	
knows the guide	99
uses the guide	89

SD: standard deviation.

Table 2 Triage nurses (n = 145) who think the symptom is related to urinary tract infection

Symptom	Percentage of triage nurses
Non-specific complaints	
abdominal pain	100
fever	95
flank pain	93
general malaise	90
incontinence	81
vomiting	24
diarrhoea	7
weight loss	6
delayed height growth	5
Typical UTI-related complaints	
haematuria	99
dysury	98
pollakiuria	98
strangury	87

Most nurses would ask that the child be brought to the GP co-operative (see Table 3). They would ask for a urine sample in such a case, and usually gave instructions about how to collect the urine: washing the genitals, using a urine collection bag for very young children or a clean jar, sampling morning and midstream urine, and keeping the urine refrigerated or delivering it within 2 hours. If the child was not asked to appear at the GP co-operative, all triage nurses gave advice or information about drinking liquids, alarming symptoms, when to contact the GP co-operative again (each item $\geq$60%); micturition, temperature, and hygiene (each item < 20%).

The feverish child

Table 3 shows that fewer than 20% of the triage nurses thought UTI to be likely in vignettes 2 and 3 and for the case of a boy in vignette 4. For the case of a girl in vignette 4, fewer than half thought UTI was likely. The main reasons for suspecting UTI for boys was fever without focus; and for girls, fever without focus, and sex. The main reason for not suspecting UTI was that another illness might be causing the fever. Other, open answers given were that the incidence of UTI in the vignettes is low and that there were no specific UTI complaints. The great majority of the triage nurses would ask the parents to bring the child to the GP co-operative if vignettes 3 and 4 applied. If a child was not asked to appear, advice would be given about when to contact the GP co-operative again.

Discussion

This study shows that more than 90% of triage nurses at GP co-operatives acted in accordance with the guidelines concerning asking the parents to bring the children in vignettes 1, 3, and 4 to the GP co-operative and providing a urine sample if UTI is suspected. However, the proportion of triage nurses who would advise how to collect the urine was smaller. Also, many triage nurses wanted to see the patient in vignette 2, although this is not recommended: advice by telephone is considered sufficient if the child is older than 3 months, has had fever for 3 days or less, does not have severe symptoms, and is not seriously ill.[13] Besides this, most triage nurses did not think UTI was likely when a child with fever without focus was presented.

As far as we know, no other studies have reported on this topic. Most studies about the management of children with UTI or fever dealt with GP management. Vernon *et al* found a wide variation in clinical practice by and between GPs.[14] Although the guideline adherence of triage nurses was generally high, it is likely that their practice varies as well.

There are some explanations for our results. Triage nurses at GP co-operatives usually know nothing about the child's medical history, and therefore want the child to appear (e.g. vignette 2). The setting can also explain why relatively few triage nurses advised how to collect urine, more specifically, morning urine (47% of the triage nurses who gave advice). Because of the opening hours of the GP co-operatives, collecting

Table 3 Alertness of the 145 triage nurses to child urinary tract infection or fever without focus[a]

	Vignette 1	Vignette 2	Vignette 3	Vignette 4	
	♂/♀	♂	♀	♂	♀
UTI likely	na	19	18	17	46
Reason why UTI is likely					
sex	na	13	38	10	50
age	na	17	33	19	25
no focus	na	88	50	76	48
duration of fever[b]	na	4	0	3	6
Reason why UTI is not likely					
other focus	na	89	81	91	94
no specific UTI complaints[b]	na	0	5	1	4
incidence UTI low[b]	na	0	10	2	0
persistent fever without focus[b]	na	4	0	0	1
Child to appear at GP co-operative	92	80	90	96	98
Urine sample	99	na	na	na	na
Instructions about collecting urine	70	na	na	na	na
If not presented at GP co-operative, advice given	100	100	93	100	100

[a]All values are given as percentages.

[b]Open answers.

♂ = male; ♀ = female; na = not asked.

morning urine is usually impossible, so this instruction was not relevant. Many triage nurses did not give instructions about using a urine collection bag (42% of triage nurses who gave advice) because toilet-trained children do not need a bag. As in vignette 1, it was logical not to give this advice. Furthermore, urine collection bags are sometimes unavailable at GP co-operatives, and must then be obtained from pharmacies, which have limited openings hours or are closed at night and on weekends. Although UTIs were not the first thing on a triage nurse's mind when a child with fever without focus was presented, it is encouraging that they wanted the child to appear anyway. Then it is up to the GP to decide whether a UTI is likely. However, caution is advocated, because even if a focus like otitis media exists, there might still be UTI as well.[15] These results may be considered representative for all Dutch triage nurses, as there were no significant differences in background variables among the GP co-operatives.

This study has some limitations. Because of the limited information in the vignettes, more triage nurses might have decided to request the child in vignette 2 to appear than they otherwise would. The reason for not giving more information was, as already stated, that UTI might exist even if another focus is found. A second limitation is the use of self-reporting behaviour, which may lead to overly optimistic adherence. However, Peabody *et al* showed that vignettes appear to be a valid and comprehensive method that directly focuses on the process of care provided in actual clinical practice.[16] Furthermore, Bonetti *et al* showed that using case descriptions predicts actual behaviour better than the more usual format (i.e. using self-reports of beliefs) when measuring intention.[17] The high proportion of triage nurses not suspecting a UTI might be explained by the way the question was asked ('Do you think a UTI is likely'): 'likely' may mean '10% chance' to one person and '50% chance' to another.

This study only gives a first impression about UTI and fever in children at GP co-operatives. Future research could focus on motives for the way triage nurses act, or use administration systems as a data source to measure actual behaviour. Possible interventions to improve the detection of child UTI could focus on the importance of timely detection. Information could be given about the non-specific complaints children with UTIs have, even if another focus exists. Triage nurses should ask parents to provide a sample of the child's urine more often; however, overdiagnosis should be prevented.

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CONFLICTS OF INTEREST

None.

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