

Chapter 8

Referral of low urgent children as triaged by the Manchester Triage System, to general practice; efficiency and cost savings

M. van Veen

F. ten Wolde

M.J. Polcy

M. Ruige

A.H.J. van Meurs

C. Hablé

J. van der Lei

E.W. Steyerberg

H.A. Moll

FLO III

Submitted

ABSTRACT

Aim To evaluate costs and compliance of referral of low urgent children who present at the emergency department (ED), to the general practitioner cooperative (GPC).

Methods Prospective observational before-after study. During six months in 2008 the triage nurse discussed referral to the GPC with parents, when self-referred children with a non-traumatic problem, aged 3 months – 16 years presented at the ED and were triaged as low urgent according to Manchester Triage System. A telephonic follow up was performed 2–4 days after referral. Real costs were compared between ED consultation (pre-intervention period) and GPC referral (post-intervention period). Compliance of referral was studied during four days a week.

Results 140 patients were referred to the GPC. 101/140 patients (72%) were reached during follow up. After discharge seven patients (7%) had an unscheduled revisit. No patients were subsequently hospitalized. Satisfaction was graded as 6.6 (95% CI 6.2–7.1) on a 0–10 scale. 275 patients were included to study compliance. Data on 28/275 patients (10%) were missing. 95/247 (38%) patients were referred to the GP. 46/247 parents (19%) refused referral. For 106/247 patients (43%) referral was not initiated by the nurse mainly because of co-morbidity or the nurse expected she could not convince the parents. Mean costs per patient were €106 for the pre-intervention period and €101 for the post-intervention period.

Conclusion Patients were moderately satisfied and referral resulted in a small cost reduction. Effectiveness was not optimal. Larger cost reductions are feasible if more patients are referred and patients would be referred during daytime as well.

INTRODUCTION

A substantial part of the visitors of emergency departments (ED) are low urgent and present on their own initiative.¹⁻³ This may increase waiting times for all patients and has an impact on health care costs. It raises the question whether it would be more appropriate to manage these patients in other locations, freeing capacity in the ED for more seriously ill or complicated patients.

Several alternatives for the care of low urgent patients have been described, such as 'fast track units' at the ED, general practitioners (GP) who see patients at the ED and integrated GP cooperatives (GPC) functioning independently but situated next to the ED.⁴⁻⁶

Evidence is scarce about the effects on patient outcomes, resource utilization, and costs of referring paediatric patients to the GPC.⁷

The Manchester triage group, who developed the Manchester Triage System (MTS) stated that low urgent, non-traumatic patients could be referred to primary care emergency centres but effects of referral should be evaluated.⁸ We recently evaluated safety of the MTS to identify low urgent children, and concluded that referral might be safe for children older than one year of age, except for patients with dyspnea, gastro-intestinal problems or fever without other specific signs.⁹ The effects of actual referral of MTS low urgent patients from the ED to another caregiver have, to our knowledge not been studied.

In today's healthcare arena, healthcare professionals and institutions are increasingly pressed to show that their treatments are cost-effective and evidence based. Therefore, the aim of this study was to evaluate compliance and costs of referral of low urgent children who present to the ED, to the GPC. It was hypothesized that referral of low urgent patients is generally acceptable for parents, and associated with a reduction in cost.

METHODS

Study design

Prospective observational before-after study. We evaluated effects on costs and patient satisfaction of referring low urgent children to the GPC. Details of consultation at the ED were reported before.⁹ Referral of low urgent patients was performed as part of standard ED care. Medical ethics committee approval was hence not required for this study.

Manchester triage system

The MTS is a five level triage system and consists of 52 flowcharts specific for a patient's presenting problem. Each flowchart consists of specific discriminators, eventually leading to an urgency category. We used an adapted version of the MTS, which showed to improve validity. The modifications were developed for different age groups and mainly concerned patients with fever.¹⁰

Setting

We conducted the study from May to December 2008 at the ED of the Haga Hospital-Juliana Children's hospital, The Hague in the Netherlands, a mixed paediatric-adult ED of a large teaching hospital visited by nearly 30,000 patients per year of which about 18,000 are children. The three participating GPCs, which together provided out-of-hours primary care to approximately 115,000 patients in 2008, are situated 3, 6 and 12 km from the hospital ED.

Study protocol

During the post-intervention period, referral to the GPC was discussed with the parents of patients when presenting at the ED between 17.00 until 22.00 on weekdays and from 08.00 until 22.00 in the weekends and when they met the following inclusion criteria: self-referred (not referred by physician, other health professional or ambulance), age between 3 months and 16 years, presentation with a non-traumatic problem, and triaged as MTS urgency level 4 or 5.

Patients were not referred to the GPC if nurses felt that a patients' underlying disease required consultation at the ED. Compliance was evaluated during an average of four days/week, when a research employee was present. (98 week – and 17 weekend days). If parents refused referral, they fill out a questionnaire about their reasons. If parents agreed with referral, an appointment was made at one of the cooperating GPCs at the same day. If ED nurses did not initiate referral, they were required to record their reasons and the patient was treated at the ED.

Follow-up

We performed a follow-up using standardized telephonic questionnaire 2–4 days after the ED visit. Parents were asked about the child's general health, development of the chief complaint, unscheduled revisits and subsequent hospitalization. Parents of referred patients to the GPC were asked if they actually went to the GPC and to grade their satisfaction with the proceedings on a scale from 1–10. If parents were not reached by phone, a written questionnaire was sent.

Data collection

Patients' characteristics and urgency were recorded in electronic medical files by ED nurses and receptionists. Consult reports of referred patients were retrieved from the GPC. Telephonic follow up calls were performed by a trained nurse researcher or medical student.

Economic evaluation

Taking a broad perspective, the economic evaluation included the costs incurred at the ED, of GP care and costs of traveling to the GPC. We compared the total mean cost per patient between the situation in which all patients were seen at the ED (pre-intervention period) and the situation in which low urgent patients were referred to the GPC (post-intervention period). We took into account that during the post-intervention period in some cases referral was either rejected by the parents or not initiated by the ED nurse. All costs were calculated for the year 2006 and reported in euros (€).

The cost price of an ED consultation comprised the cost categories as stated in table 1.

Personnel costs per minute for nurses, residents, and paediatricians were based on the Collective Employment Agreement for Hospitals. Taking into account public holidays, vacations, illness, and study leave, the number of working hours per person per year was set at 1,540 (nurses), 1,988 (residents), and 2,100 (medical specialists) respectively leading to hourly personnel costs of €38, €32 and €71, respectively, including increments for holiday allowances, social security expenses, and allowances for working irregular hours. Cost prices of laboratory tests and diagnostic radiology (ultrasound, X ray, CT/MRI) were multiplied by the mean quantity of diagnostic procedures per urgency category.

Regarding the post-intervention period, we calculated personnel costs of explaining referral to the GPC to patients by the nurse (based on the above mentioned cost price of €38 per hour), costs made by the parents to travel to the GPC (€0.16 per kilometre + €2.50 parking costs), and costs of GPC consultation. The cost price of a GPC consultation was an integral cost price, including all costs of personnel, materials and buildings.

Sensitivity analysis

We considered mean prices per patient for different scenarios; when more patients accept referral, when referral is more often initiated by the nurse and when patients are referred during daytime.

Table 1 | Mean cost price of a visit to the ED by a low-urgent patient (in euros).

Variable costs	<i>Personnel*</i>	Nurse	€ 34
		Resident	€ 29
		Medical specialist (supervision)	€ 8
	Diagnostics		€ 12
Non variable costs		Triage (software and personnel costs)	€ 4
		Other personnel costs**	€ 11
		Materials	€ 7
Total			€ 106

* Costs depended of the duration of consultation (Nurse and resident) or duration of supervision (medical specialist)

**Based on 17,000 patient contacts for children <16 years

RESULTS

Safety and parental satisfaction

During the total post-intervention period 140 patients were referred to the GPC. Follow-up data were available in 101 of 140 referred patients (72%). Seven patients had an unscheduled revisit (7%, 95% CI 3–14%), five at the GP and two at the ED. Development of chief complaint was registered for 81 of 101 patients. In 68 of these 81 patients (84%), the chief complaint had improved. In 12 patients (15%) the complaint did not change and in one patient the complaint worsened. 95 patients graded their satisfaction with care provided with an average of 6.6 (95% CI 6.2–7.1) at a 0-10 scale.

Compliance

During the days for which compliance was evaluated, 311 patients attended the ED. 36 of these 311 (12%) were excluded because the MTS was overruled. 28/275 (10%) patients were not referred without documentation of the reason. Compliance analysis was done in the remaining 247 patients. 95/247 patients (38%) were referred to the GPC. 46/247 parents (19%) refused referral. The nurse did not initiate referral in 106/247 patients (43%). Detailed information on reasons for rejected referral and not initiated referral by the nurse is provided in figure 1. 46% (n=16/35) recorded that they had accepted referral if the GPC was situated next to the the ED.

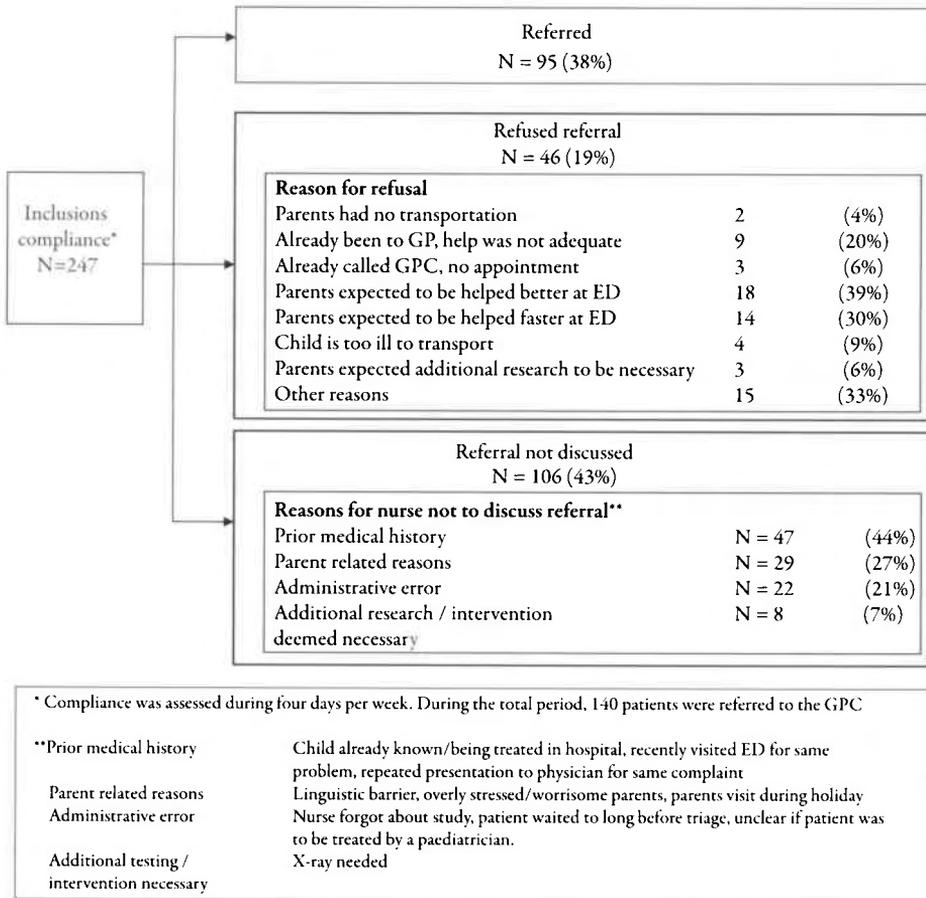


Figure 1 | Compliance: flow of included patients and reasons for rejection of referral or not initiating referral to GPC by the nurse.

GPC consultation

Of the 140 patients referred to the GPC, 101 (72%) were reached during telephonic follow-up, 13% (n=13/101) of them did not attend the GPC. None of them were hospitalised.

81 patients gave permission to use data collected from the GPC and GPC reports from 75 GP consultations could be collected. After attending the ED, patients were seen at the GPC after a median time of 77 minutes (IQR 61–130).

At the GPC, diagnostics were performed in two consultations (3%), both concerning urine analysis. In 44/75 (59%) patients the GP prescribed medication of which 8/75 (11%) concerned oral antibiotics. 68/75 patients (91%) were discharged from medical care, 6/75 (8%) got an appointment for check-up with their own GP and 1/75 patient (1%) was sent

back to the ED because the GP suspected an infection with respiratory syncytial virus. The average length of a consultation at the GPC was 8 minutes (95% CI 7–9 minutes).

Economic evaluation

The mean cost price of consultation at the ED for non-referred low urgent patients was €106 (table 1). To calculate costs for referral to the GPC we used the actual situation as described above resulting in mean costs per patient during the post-intervention period of €101 (table 2). Implementation of referral to the GPC led to a cost reduction of €5 per patient (5%).

On a national level, in the Netherlands yearly 288,000 children visit the ED. (11, 12) 31% is triaged as low urgent according to the modified MTS and non-referred and 50% of them presents with a non-traumatic problem. The urgency level would be overruled in 10%. Therefore, annually 40,000 patients could be referred to the GPC. In case of 19% refusal and 43% is not referred based on the nurse's opinion, yearly costs would be ($40.000 \times \text{€}101 = \text{€}4,040,000$). When compared to the pre-intervention setting ($40.000 \times \text{€}106 = \text{€}4,240,000$), €200,000 could be saved each year.

Figure 2 shows the mean costs per patient for different scenarios. Especially the scenarios in which referral was not initiated (D) and referral of patients during daytime hours when everybody accepted referral (F), resulted in somewhat larger cost reductions (€94 and €87, respectively).

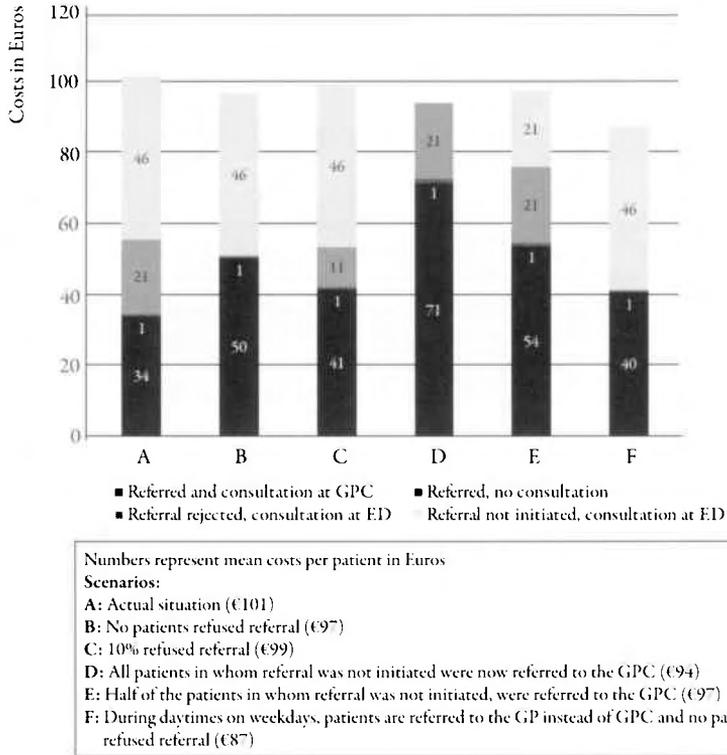


Figure 2 | Sensitivity analysis for mean cost per patient based on study findings for different scenarios.

Table 2 | Determinants of costs of the pre-intervention and post-intervention period.

	Patient flow	Triage ED consultation	Discussing referral	Travel costs	GPC consultation	Mean total costs of consultation(€)
Pre-intervention period	100%	€ 4	-	-	-	€ 106
Post-intervention period	34%	€ 4	€ 6	€ 3	€ 87	€ 100
Referred, no GPC consultation	5%	€ 4	€ 6	-	-	€ 10
Referral rejected, ED consultation	19%	€ 4	€ 6	-	-	€ 112
Referral not discussed, ED consultation	43%	€ 4	-	-	-	€ 106
Mean costs	100%					€ 101

DISCUSSION

In this study, referral of low urgent patients to the GPC resulted in a small cost reduction. Patients were moderately satisfied and 38% accepted referral to the GPC.

Main reasons for parents to refuse referral were that they expected better or faster care at the ED. Secondly, in 43% nurses did not initiate referral, mainly because of co morbidity. These findings led to the conclusion that at this stage the referral of low urgent children has a low efficiency. Other studies evaluated the process in which all low urgent patients were referred and patients were not given the possibility to refuse.^{4,5} When all patients in which referral were initiated would have consulted the GPC, referral to the GPC would have been more efficient.

Conditions can be improved to refer more patients. For example the GPC may be located next to the ED, as is increasingly common in the Netherlands.⁷ In our study 46% of the patients who refused referral, would have gone to the GPC if it was located next to the ED. Furthermore, in this study's main analysis, the included patients visited the ED during out-of-office hours. In the Netherlands, urgent primary care is then provided by GPCs, the costs of which (€87 per consultation) are much higher than care provided by the patient's own GP during office hours (€21 per consultation).¹³ Therefore, as the sensitivity analysis showed, the scenario in which patients would be referred to their own GP during office hours (and if all patients would accept referral) would lead to further cost savings (figure 2).

When patients would initially call the GPC (rather than visit the ED), they would be triaged using the urgency classification of the Netherlands College of General Practitioners. Using this system, 50% would not be seen at the GPC but a self care advice would be provided by telephone. This scenario would lead to even more cost savings. However, safety of this guideline was only evaluated in two studies and not optimal.^{14,15}

To our knowledge the effect of sending ED patients triaged as low urgent to the GPC, was not studied before. Other referral policies were evaluated. The effect of referring low urgent patients to a fast track area resulted in a cost reduction.^{4,5}

To assess safety of referral of low urgent triaged patients to a GPC, we should focus on hospitalization after referral and unscheduled revisits after discharge. After referral 7/101 patients had an unscheduled revisit and none were hospitalized. In our previous follow-up study of 1,970 similar patients seen at the ED, the proportions of unscheduled revisits and hospitalizations were 11% and 0.14%, respectively.⁹ It can be concluded that referral to the GPC in our study had no serious adverse effects.

We used precise methods to calculate real economic cost prices. This study did not rely on charges, which are not necessarily good surrogates for real costs. Another strength of the study was that its scope was not restricted to the ED, but included detailed cost assessment of GP care and the sacrifices made by parents (travelling costs).

Limitations

Some limitations should be considered. The studied ED is one of the EDs in the Netherlands with the largest number of children ($n=15,000$ yearly). However, we are aware that EDs in other European countries usually see many more patients. Furthermore, the cost calculations were done in only one ED and one GPC. It is not sure whether the results can be generalized to other settings, such as university hospitals.

This study was not sufficiently powered to detect differences in the amount of hospitalisations after discharge between the post-intervention and pre-intervention period. Future research should include costs of hospitalisation (as well as costs of follow-up visits to the ED or the GP) in the cost analysis. For a general hospital costs per inpatient day are €514¹⁶, so differences in hospitalization rate have a large effect on the total costs.

CONCLUSION

Patients were moderately satisfied and referral resulted in a small cost reduction. Effectiveness was not optimal since a minority could be referred and many patients refused referral. Larger cost reductions are feasible if more patients are referred and patients would be referred during daytime as well.

Acknowledgements

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