Drug information leaflets improve parental knowledge of their child's treatment at paediatric emergency department discharge

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ABSTRACT

Background Hospital discharge is a complex multidisciplinary process that can lead to non-compliance and drugs-related problems. Crucial issue for children is parental knowledge of discharge treatments, especially in the time-limited and stressful environment of an emergency department (ED).

Objective To compare parental correct knowledge of treatment with and without supply of customised drug information leaflets for the 10 most commonly prescribed drugs.

Method Inclusion criteria: paediatric patients (0–16 years) with French-speaking parents discharged from ED of the paediatric department of Geneva University Hospitals *before* (phase A) and *after* (phase B) intervention.

Intervention Supply and brief comment of drug information leaflets focusing on specific information not available in official drugs information documents. Follow-up Semi-structured phone interview within 72 h after discharge to evaluate the percentage of parents with correct knowledge of dose, frequency, duration and indication of drugs. Multivariate analysis to identify factors associated with correct knowledge (phases A/B, drugs collection at usual pharmacy, drugs categories).

Results 125 patients were included (phase A: 56; phase B: 69). Drug information leaflets were given to 63/69 ED patients (91%), covering 96/138 prescribed drugs (70%). Parental knowledge was significantly improved in phase B (dose: 62.3% to 89.1%; frequency: 57.9% to 85.5%; duration: 34.2% to 66.7%; indication: 70.2% to 94.9%; $p < 0.0001$). Phase B and collection of drugs at usual pharmacy were significant factors associated with correct knowledge.

Conclusions Drug information leaflets significantly improved treatment knowledge of French-speaking parents after paediatric ED discharge. Leaflets are now available online for general population.

treatment at home and a higher risk of adverse events and unexpected repeated ED visits and hospitalisation.^{5–6}

Specific problem can occur with paediatric population at hospital discharge because of the use of unlicensed (imported or compounded by pharmacists) and off-label medicines or weight-based dosages. These may increase risks for poor compliance, medication errors or other adverse events at hospital discharge.^{7–8}

A key point for a satisfactory continuum of care involves healthcare professionals giving adequate instructions to patients about medications.²

Written materials can reinforce verbal communication and could improve information recall and satisfaction among parents of children being discharged from hospital.^{9–10} Different studies assessed that provision of additional educational leaflets with accurate, easy and comprehensible wording, as well as picture-based instructions is a good way to support verbal medical advice at hospital.^{11–13}

Parents and patients are keen on drugs-related information, particularly in form of leaflets. In a study involving children discharged from ED, the majority of the families expressed their wish to receive hospital educational health information as leaflets.¹⁴

In a previous study conducted in our hospital with parents and paediatric patients discharged from ED, we could show that parents and patients have high expectations on additional educational health information that are not contained in official patients' drug's information leaflets or given by ED practitioners.¹⁵

In our setting, provision of written patient information is not a standard of care in discharge teaching. Emergency practitioners give discharge prescription to patients with only a short, not standardised oral comment. The official patients' drug's information leaflets supplied with each product available on the market give general information that is not specific to the patient's condition and could not answer all specific questions parents could have at home for their children.

Different organisations have already created drug information leaflets. An example is the UK 'medicines for children' leaflets available on the internet that were developed jointly by UK paediatric pharmacists, paediatricians and parents.¹⁶

Because a short French-speaking written information was required, decision was made to develop our specific drug information leaflets for the 10

INTRODUCTION

Medication-related problems often occur at hospital discharge. They can be related to hospital prescription, drug dispensing or home administration.^{1–2} A crucial issue for an optimal treatment adherence at home is patients' knowledge and understanding of their treatment. Yet it is well known that patients can misunderstand elements of their discharge plan.^{3–4} These misunderstandings are current in the time-limited and stressful environment of an emergency department (ED) and they can result in patients' failure to adhere to their

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most commonly prescribed drugs, in collaboration with ED practitioners and hospital pharmacists to help parents remember details of their child's treatments in order to improve the continuity of pharmaceutical care after paediatric ED discharge.

Aim of the study

This study aimed to compare the percentage of parents with correct knowledge of dose, frequency, duration and indication of their child's treatment with and without supply of customised drug information leaflets for the 10 most commonly prescribed drugs at paediatric ED discharge.

METHOD

Setting

The study was conducted at the ED of the paediatric department (125 beds) of Geneva University Hospitals (HUG; 1900 beds for a total population of 500 000).

This study was approved by the HUG's institutional ethical review board (Protocol no 09-292). Written informed consent was signed by one or both parents for each patient after reading an information letter that broadly described the study.

Study design

Paediatric patients aged 0–16 years with French-speaking parents admitted to the ED and discharged with at least one prescribed medication during the pharmacist's working hours (08:00–17:00, weekdays, during the data collection periods) were enrolled.

Recruitment was scheduled in two phases. Phase A took place from May 2010 to June 2010 and no intervention was made. Physicians gave prescriptions to parents with the usual brief explanations.

For phase B, simple and explicitly written drug information leaflets were created by a team of ED physicians and pharmacists gathering responses to most questions parents could not find in the official drug's leaflet.¹⁵ They put basic paediatric information down in a common and understandable language (ie, reasons that should make the parents call a paediatrician, how to take the drug, what to do if a child cannot swallow or does not like the drug's taste, possibilities of taking other medication at the same time, how to store the medication, when to stop treatment etc).

Ten leaflets were created for the most frequently prescribed drugs and treatment in ED over the past 12 months, representing 56% of the number of drugs prescribed (acetaminophen, ibuprofen, amoxicillin with and without clavulanic acid, ceftibuten, antihistaminic drugs, rehydration fluids, osmotic laxatives, salbutamol with or without corticoids and use of inhalation chambers).

These leaflets were given to parents by the hospital pharmacist before ED discharge from March 2013 to April 2013. Pharmacist did not give information about treatment but only presented the leaflets to parents as an additional drug information they can be used at home.

A semi-structured phone interview of parents was performed by the pharmacist within 72 h of discharge in both phases to evaluate parental knowledge about their child's treatment (percentage of parents knowing correct dose, frequency, duration and indication of all prescribed drugs).

The standardised questionnaire was adapted from one used in previous studies.^{17 18} It was made of binary yes-or-no answers about patient's characteristics and open questions about dose, frequency, duration and indication of treatment for each drug prescribed.

Parents' knowledge was considered to be correct when the answers matched the discharge prescription recommendations for dose, frequency and duration for each drug. Indication was compared with the medical report. They were also asked about their satisfaction with the information provided and the instructions received from hospital and community pharmacies after discharge.

The same pharmacist made the phone calls during both study phases, whether the intervention in phase B was made by a different pharmacist. After three unsuccessful calls within 3 days, patients were considered to be lost for the purpose of the study. For analysis, drugs prescribed were classified in three broad categories:

- ▶ Category A: analgesics (nervous system), anti-inflammatory and antirheumatic products; topical products for joints and muscular pain; muscle relaxant drugs (ATC classes: N02, M01, M02, M03).
- ▶ Category B: anti-infective for systemic use (ATC classes: J01, J05).
- ▶ Category C: all other drugs and treatment.

Statistical analysis

A power calculation based on findings from a previous study¹⁹ indicated that a minimum sample size of 45 patients discharged from ED in each phase would be needed to demonstrate a meaningful change (56% to 85%) in parental knowledge (power of 80% and bilateral risk of 0.05). The sample size in phase B was increased to anticipate missing data.

Parental and treatment characteristics were described with median and IQR (continuous data) and by percentage (categorical data) and were compared using χ^2 test (or Fisher's exact test if the expected counts were below five) or Mann–Whitney U test.

Factors associated with correct knowledge (phases A/B, drugs collection at usual pharmacy and categories of drugs) were assessed using univariate and multivariate logistic regression models. Since several drugs could be prescribed, a mixed-effects model was used. ORs were reported with 95% CIs. In the multivariate models, the OR was adjusted for the type of pharmacy (usual or not) and drug categories (A, B, C). All analyses were conducted with S-plus 8.0 for Windows (Insightful Corp., Seattle, USA) and STATA V13.0 (STATA Corp, College Station, Texas, USA). The significance level was 0.05 two-sided.

RESULTS

Phase A screened 67 patients and 56 were enrolled. Phase B screened 79 patients and 69 were included (figure 1). Median age of children was 6.5 years (min:3; max:11) in phase A and 5 years (min:2; max:9) in phase B ($p=0.34$).

Mean number of drugs per patient was 2.16 (min:1; max:7) in phase A and 2.06 (min:1; max:5) in phase B. In both phases, the most prescribed drugs were acetaminophen (27/116 (23%) in phase A; 35/138 (25%) in phase B) and ibuprofen (22/116 (19%) in phase A; 31/138 (23%) in phase B). Categories of drugs were not statistically different between phase A and phase B.

In both phases, the majority of parents went to their usual pharmacy to collect the drugs after hospital discharge. Other patients and drug characteristics were also similar in both phases (table 1).

In phase B, drug information leaflets were given to 63/69 patients (91%) (six had prescribed drugs for which no leaflets were available), covering 96/138 prescribed drugs (70%).

Pharmacist spent approximately 5–10 min with parents for enrolment and leaflets delivery, 5 min for collecting patient's data and 10 min for telephone follow-up call.

Figure 1 Study design and results.

Parental knowledge of their child's treatment improved significantly between phases A and B, on all items (figure 2). Indication and duration of treatment were respectively the best and the least known items in both phases.

Univariate analysis revealed a significant improvement in parental knowledge of the four items ($p < 0.001$), with ORs > 4 .

Multivariate analysis showed that the effects persisted and were even higher after adjusting for collection at the usual community pharmacy and categories of drugs. Phase B and collection of drugs at the usual pharmacy were independent factors associated with a correct parental knowledge for the four items.

Drugs categories could also be associated with correct parental knowledge for the items 'frequency' and 'duration' of category B drugs (table 2).

Parental satisfaction about ED discharge treatment information was not significantly different in phases A or B (86% and 81% said they were 'very satisfied', respectively, $p = 0.26$). The majority of all parents were 'very satisfied' by the information given to them by community pharmacy teams (85.2% in phase A and 89.5% in phase B, $p = 0.57$).

DISCUSSION

Drug information leaflets specifically designed by pharmacists and physicians and supplied with the prescription at paediatric ED discharge significantly improved the knowledge of French-speaking parents on their child's treatment.

Even if the number of drugs per prescription is low in ED and half of the medications are common over-the-counter drugs such as acetaminophen and ibuprofen, parents seemed to have

poor treatment knowledge in phase A. This could be explained by the fact that over-the counter drugs are often considered to be well known by parents and that healthcare professionals

Table 1 Patient and drugs characteristics

Patient characteristics	Phase A (n=56)	Phase B (n=69)	p Value
Female	31/56 (55.4%)	27/69 (39.1%)	0.10
Age (years)	6.5 (3;11)	5 (2;9)	0.34
Phone interview			
With mother	41/55 (74.5%)*	48/69 (69.6%)	
With father	14/55 (25.5%)	21/69 (30.4%)	
Medication collected at usual pharmacy?	46/56 (82.1%)	46/68 (67.6%)*	0.10
Pharmacy visit at the day of discharge?	50/56 (89.3%)	55/67 (82.1%)*	0.39
Prescribed drugs			
Number of drugs prescribed	116	138	
Mean number/patient	2.16 (1;7)	2.06 (1;5)	0.91
Drug categories†			
Drug category A	51/115 (44.3%)*	72/138 (52.2%)	0.08
Drug category B	9/115 (7.8%)*	18/138 (13%)	
Drug category C	55/115 (47.8%)*	48/138 (34.8%)	

*The numerator is different from the sample size because of missing data.

†Category A: analgesics (nervous system), anti-inflammatory and antirheumatic products, topical products for joints and muscular pain and muscle relaxant drugs (ATC classes: N02, M01, M02, M03).

Category B: anti-infective for systemic use (ATC classes: J01, J05).

Category C: all other drugs and treatment.

Figure 2 Parental knowledge of treatment. ED, emergency department.

considered giving further information is not useful. Duration of treatment is the lesser-known item, probably because it is not always specified by doctors on the prescription²⁰ or because parents stop treatment as soon as the child gets better. In multivariate analysis, only category B drugs (anti-infective) were associated with better parental knowledge of duration and frequency of treatment certainly due to the importance of these items on efficacy of these specific drugs.

Compared with inpatient physicians, ED professionals face the specific challenges of providing high-quality information in a time-constrained environment without previous knowledge of the patient.⁴ It is also known that ED populations can be particularly at risk of limited literacy.²¹ Despite high parental satisfaction with communication, previous data have suggested that many cannot fully recall their child's diagnosis and treatment.²² The improvement in parental knowledge after intervention was particularly high. One can suppose that by focusing on the 'need to know' information and limiting documentation to essential content, written material can reinforce verbal information given at discharge. This would corroborate conclusions of a recent literature review on the subject.⁴

Parents are generally in a hurry to leave the ED and the leaflets were most of the time given with a very brief presentation of the main topics developed. Conversation sometimes struck up between parents and pharmacist when drug leaflets were

given and could also have contributed to this knowledge enhancement.^{19–23} Receiving the leaflets and being enrolled in a study knowing they would be asked about their child's treatment a few days later could also have influenced parents about their treatment knowledge but these two bias could not be avoided.

The two most frequently prescribed drugs in our study (acetaminophen and ibuprofen) were the same as in a comparable study that collected hospital discharge prescriptions from community pharmacies.²⁰ Even if the study was conducted in slightly different periods in phases A and B, the proportion of drugs per categories was not statistically different.

Although this is not mandatory for health insurance reimbursement in Switzerland, the study showed that most parents collect the drugs from their usual pharmacy and that they were very satisfied by the information they encountered. This factor was associated with better knowledge of ED discharge treatments, but multivariate analysis showed that this effect is independent of drug leaflets effect.

A limitation of our study is that patients with non-French-speaking parents or with parents refusing to participate were not included in our study. They are probably at higher risk of poorly understanding discharge instructions.²⁴ Several studies focused on 'health literacy', language barriers or cultural influences to be associated with poor understanding or other adverse consequences including miscommunication and poor continuity of care.^{25–27} In our country, health literacy is generally high²⁸ but Geneva is also an international city with lots of foreigners. This population most likely go to ED and communication could then be a crucial problem for health professionals. To overcome this limitation, it would be useful to translate the leaflets in several languages frequently spoken in the international city of Geneva and to evaluate their impact on parent's knowledge. Otherwise, video discharge instructions proved to have a positive influence on parental knowledge and satisfaction, and could have the advantage of being understood by different populations of patients.²⁹

It should also be noticed that the leaflets distribution was not made at night-time or weekend, which can be very busy time for ED and at higher risks of lack of communication.

We chose to use the question/answer communication method used in the UK 'medicines for children' leaflets¹⁶ but in the future it should be useful to assess level of language of our drug information leaflets.

Another weak point of the study is that it focused on parental knowledge but could not detect compliance, administration

Table 2 Parental knowledge of treatment

		Dose		Frequency		Duration		Indication	
		OR (95% CI)	p Value	OR (95% CI)	p Value	OR (95% CI)	p Value	OR (95% CI)	p Value
Univariate									
Phase	A	Ref		Ref		Ref		Ref	
	B	5.9 (2.7 to 12.8)	<0.001	4.5 (2.3 to 8.7)	<0.001	4.4 (2.3 to 8.2)	<0.001	14.9 (4.5 to 49.8)	<0.001
Multivariate									
Phase	A	Ref		Ref		Ref		Ref	
	B	7.1 (3.2 to 15.8)	<0.001	5.8 (2.8 to 11.8)	<0.001	5.2 (2.6 to 10.4)	<0.001	19.0 (5.1 to 71.1)	<0.001
Usual pharmacy	No	Ref		Ref		Ref		Ref	
	Yes	3.1 (1.3 to 7.5)	0.01	3.5 (1.6 to 8.0)	0.002	3.1 (1.3 to 7.5)	0.01	7.0 (1.5 to 32.8)	0.01
Drug categories									
	A	Ref		Ref		Ref		Ref	
	B	3.2 (0.7 to 15.1)	0.13	15.0 (1.6 to 140.1)	0.02	20.4 (4.0 to 103.7)	<0.001	1.9 (0.2 to 15.2)	0.61
	C	1.4 (0.7 to 3.1)	0.36	1.2 (0.6 to 2.3)	0.66	1.2 (0.6 to 2.4)	0.59	1.1 (0.4 to 3.7)	0.21

errors or adverse drug events. Further studies would be needed to assess these crucial points.

The pharmacist was a key contributor to the development of the drugs leaflets due to his knowledge of pharmaceutical forms and outpatient drugs market. Pharmacy staff is low in our hospital setting, making this intervention valuable because it could be performed by other disciplines, such as nurses or doctors in the context of provision of drug information at discharge. Drugs leaflets could also be widely accessible to general population through a book³⁰ and a website intended for parents of sick children, <http://www.monenfantestmalade.ch/fiches/categorie/mon-enfant-doit-prendre-un-medicament>.

CONCLUSION

Crucial issue for continuity of pharmaceutical care after paediatric hospital discharge is parents' knowledge of treatments, especially in the time-limited and stressful environment of an ED. It is then crucial that careful and timely communication between healthcare professionals and patients or families receive continuous support and encouragement. The provision of additional educational leaflets with accurate, easy and comprehensible wording is important to support verbal medical advice.

This study assessed that drug information leaflets supplied with the discharge prescription significantly improved treatment knowledge of French-speaking parents after paediatric ED hospital discharge. These leaflets are now available for general population on HUG paediatric ED book and website 'Allô Docteur—Mon enfant est malade', <http://www.monenfantestmalade.ch/fiches/categorie/mon-enfant-doit-prendre-un-medicament>. Use of the ED leaflets could also be extended to paediatric patients discharged from other hospital wards, and leaflets could be developed for other drugs. Impact on non-French-speaking parent's knowledge should be evaluated in the future after translation of the leaflets.

Key messages

What is already known on this subject?

- Paediatric hospital discharge is a risky period for discontinuity of care.
- Crucial issue for children discharged from emergency department (ED) is parental knowledge of treatments.

What this paper adds?

- Provision of accurate, easy and comprehensible drug information leaflets with verbal comment significantly improved parental knowledge of their child's treatments.
- Leaflets are now available online at <http://www.monenfantestmalade.ch/fiches/categorie/mon-enfant-doit-prendre-un-medicament>.

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