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Effects of electronic communication between the GP and the pharmacist. The quality of medication data on admission and after discharge

WJ van der Kam[a,d], B Meyboom de Jong[c], ThFJ Tromp[b], PW Moorman[d] and J van der Lei[d]

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Background. When a patient is admitted to a hospital, the need for information about the medications prescribed is an important issue.

Objectives. Our aim was to assess whether electronic communication between the GP and the pharmacist provides better information regarding current medication when a patient is admitted to the hospital than paper-based communication.

Methods. A prospective study was carried out whereby on the day of admission and 10 days after discharge, three different data collectors independently asked the patient, the GP and the pharmacist details of the patient's current medication. Five GPs and a local pharmacy relying on electronic communication, and five GPs and a local pharmacy relying on paper-based communication were studied.

Results. A total of 139 patients were included on the first day of their admission, and 116 on the tenth day after discharge. Of the 275 drugs that the patient, the GP and/or the pharmacist reported on admission in the electronic group, 134 (49%) were reported by the patient, the GP and the pharmacist, and 79 (29%) were not reported by the patient. For the paper group, these figures were 340 drugs on admission, of which 107 (31%) were reported by the patient, the GP and the pharmacist, while 130 (38%) were not reported by the patient.

Conclusions. We conclude that electronic communication between the GP and the community pharmacist results in a better agreement between them with respect to the current medication of the patient than paper-based communication. However, electronic communication does not suffice as a solution to obtain reliable information.

Keywords. Computer communication networks, electronic communication, family practice, GP, medication, pharmacist.

Introduction

In The Netherlands, the GP acts as a gate-keeper between primary and secondary care. Each patient also has a community pharmacist to deliver the medication prescribed by the GP or the specialist in the out-patient clinic. As the number of health care workers providing care to an individual patient increases, the need for communication about the medications prescribed becomes an important issue.[1,2]

When a patient is admitted to hospital, the medical staff have to determine their current medication. To obtain that information, the medical and nursing staff often rely on different sources of information; in The Netherlands, the patient most frequently is the source of information. If additional information is required, typically the pharmacist is called to obtain the current medication. Finally, the GP or the relatives of the patient may provide additional information. The accuracy of information on current medication, however, varies.

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[a]Isala Klinieken, Location De Weezenlanden, PO Box 10500, 8000 GM Zwolle, [c]Department of General Practice and [b]Department of Social Pharmacy and Pharmaco-epidemiology, University of Groningen, Antonius Deusinglaan 4, 9713 AW Groningen and [d]Department of Medical Informatics, Faculty of Medicine and Health Sciences, Erasmus University Rotterdam, PO Box 1738, 3000 DR Rotterdam, The Netherlands. Correspondence to Wouter J van der Kam, Isala Klinieken, Location De Weezenlanden, Groot Wezenland 20, Postbus 10500, 8000 GM Zwolle, The Netherlands.

Different health care workers often provide dissimilar information on drugs and dosage prescribed.[3,4] In addition, Schiphorst *et al*. showed that when the patient was asked directly, information was inaccurate in almost half of the cases.[5] Potential reasons for dissimilar information are: the patient uses medication independently of the physician (e.g. 'borrowing' a friend's or relative's tablets),[6] patient confusion[7] and inadequate communication between the GP, the pharmacist and the specialist.[8] Dissimilar information may lead to risks due to discontinuation of the existing therapy, an overdose of the existing therapy, unexpected drug interactions and increased surgery risks (e.g. the surgeon is unaware of anticoagulant therapy).[3,4]

During hospitalization, the medication is often changed.[7,9] Therefore, after a patient has been hospitalized, other care providers, such as GPs, need to be informed of these changes. In The Netherlands, on discharge, the patient receives prescriptions that subsequently are filled by the community pharmacist. In addition, the specialist in the hospital will, typically, send a short discharge note to the GP documenting, amongst others, the medication on discharge. A more detailed discharge letter may follow this short discharge note. However, studies have shown that when the patient contacts the GP after discharge, in 45% of cases, the GP is unaware of the changes in medication during that admission.[5]

Researchers have argued that electronic communication may improve the quality of patient data.[1,2,10–14] In a recent review paper, van der Kam *et al.* conclude that electronic communication with GPs is faster than paper-based communication.[15] Evidence that the quality of data is improved by electronic communication is, however, lacking.[15] In the region of Zwolle, a number of GPs are using electronic communication to communicate with pharmacists, whereas other GPs rely on paper-based communication.

In this study, we first analyse the information on medication provided by the patient, the GP and the pharmacist on admission and after discharge of that patient. We subsequently evaluate whether the method of communication (paper-based versus electronic) is associated with improved quality of patient data regarding medication.

Methods

All GPs (five in total), in a small village of 10 500 inhabitants rely on electronic communication with the local pharmacy to transfer data about prescriptions. The GP uses an electronic patient record when writing a prescription, and this prescription subsequently is sent electronically to the pharmacist. After the prescription has been filled, the pharmacist sends an electronic confirmation to the GP. When the pharmacist fills a prescription from the specialist, the GP is also informed by the pharmacist via an electronic message. We refer to these five GPs and the local pharmacist as the *electronic group*. The next village (11 500 inhabitants) also has five GPs and another local pharmacy. These GPs, however, rely on paper-based communication with the pharmacy: a prescription on paper is given to the patient, and the pharmacist fills that prescription. The GP does not receive a confirmation from the pharmacist. We refer to these five GPs and the local pharmacist as the *paper-based group*.

In this study, we collected information from the GP, the community pharmacist and the patient on the current medication (both continuous and intermittent) of the patient on admission to the hospital, and again 10 days after his/her discharge. From February to May 1998, all patients admitted on office days from 8.00 h till 17.00 h in the hospital De Weezenlanden were asked who their GP was. If the GP was a member of either the electronic or the paper-based group, the patient was eligible for the study.

If the patient was eligible, they was asked whether members of staff were allowed to contact both the GP and the pharmacist to obtain information about current medication (informed consent). The second eligibility criterion was that both the GP and the pharmacist had to be available for questioning that same day. If the patient agreed to participate, and both the GP and the pharmacist were available, on the day of admission, three different data collectors independently asked the patient, the GP and the pharmacist details on the current medication. Ten days after discharge of the patient, the same data were again collected using the same method.

Analysis

The drugs were coded according to the anatomical therapeutic chemical (ATC) classification (seven digits). In the ATC classification, a drug with different names but with the same active substance has the same ATC code. Through the analysis, we called drugs identical if the ATC code was the same on the 7-digit level.

For the drugs reported by the patients, we compared whether the patient, the GP and the pharmacist reported the same drugs, and we compared the electronic and paper group using the chi-squared test. We subsequently compared the drugs not reported by the patient; and we compared the electronic group with the paper-based group using the chi-squared test.

Statistical analysis was done with the software package SPSS/PC+ data entry II.

Results

A total of 153 patients gave informed consent. For the patient to be included in the study, however, both the GP and the pharmacists had to be available; a total of 139 patients could be included on the first day of their admission, and 116 on the tenth day after discharge.

Of the 139 patients included on admission, 65 patients were enrolled in the practices of the GPs in the electronic group and 74 in the paper-based group. Of the 116 patients included 10 days after discharge, 54 were enrolled in the practices of the GPs in the electronic group, and 62 in the paper-based group.

In this study, we obtained information from the patient, the GP and the pharmacist. For the drugs mentioned and not mentioned by the patient on admission and 10 days after discharge, Table 1 and Figure 1 show the agreement with the GP and pharmacist. In total, the patients in the electronic group reported 196 (71%) drugs on admission, while 79 (29%) drugs were not reported on admission. As shown in Table 1, of the 196 drugs reported on admission by the patients in the electronic group at this time, 134 (49%) were also reported by both the GP and the pharmacist, 15 (5%) were reported only by the GP, 11 (4%) by the pharmacist only and 36 (13%) by the patient only (i.e. neither the GP nor the pharmacist reported that the patient used that particular medication). In comparing the electronic group with the paper-based group, it is clear that the agreement of the GP and the pharmacist with the patient is significantly higher in the electronic group (49% versus 31% on admission, and 53% versus 33% 10 days after discharge; $P < 0.001$). Table 1 also shows that there is no significant difference between the electronic and the paper-based group with respect to the number of drugs mentioned by the patient alone (13% versus 13% on admission, and 9% versus 9% 10 days after discharge).

Table 2 shows the drugs most frequently reported and those not reported at all by the patient. Of the 196 drugs reported by the patient, the five most frequently reported drugs were aspirin, metoprolol tartrate, simvastine, isosorbide dinitrate and acenocoumarol.

Discussion

Optimal medical care for patients requires adequate communication among physicians involved in that care.[1,2] In this study, the setting was the admission of patients to a hospital. Hospital staff require accurate information concerning the current medication of admitted patients, information that can be obtained from the patient, the GP or the pharmacist. The objective of this study was to assess whether electronic communication between the GP and the pharmacist provides better information regarding current medication when a patient is admitted to the hospital than paper-based communication.

We conclude that electronic communication between the GP and the community pharmacist results in a better agreement between them with respect to the current medication of the patient than paper-based communication. For the drugs reported by the patient, the agreement between the GP and the pharmacists was higher in the electronic group when compared with the paper-based group. For the drugs reported by the patient only (i.e. neither the GP nor the pharmacist reported that the patient was using that specific medication), no difference between the electronic and the paper-based group could be found (on admission, 13% in both groups; and 10 days after discharge, 9% in both groups).

Our second conclusion is that electronic communication between the GP and the community pharmacist does not eliminate the problem of dissimilar information

TABLE 1 *Agreement with the GP and the pharmacist for those drugs reported and not reported by the patient*

	On admission				10 days after discharge			
	Electronic group		Paper group		Electronic group		Paper group	
	n	%	*n*	%	*n*	%	*n*	%
Total reported by patient	196	71	210	62	200	71	198	62
Both GP and pharmacist agreed with patient	134	49	107	31	149	53	105	33
Only GP agreed with patient	15	5	30	9	17	6	33	10
Only pharmacist agreed with patient	11	4	30	9	9	3	33	10
Only reported by patient	36	13	43	13	25	9	27	9
Total not reported by patient	79	29	130	38	81	28	118	38
Reported by GP and pharmacist	54	20	49	14	40	14	34	11
Only reported by GP	13	5	44	13	26	9	40	13
Only reported by pharmacist	12	4	37	11	15	5	44	14
Total reported and not reported by patient	275	100	340	100	281	100	316	100

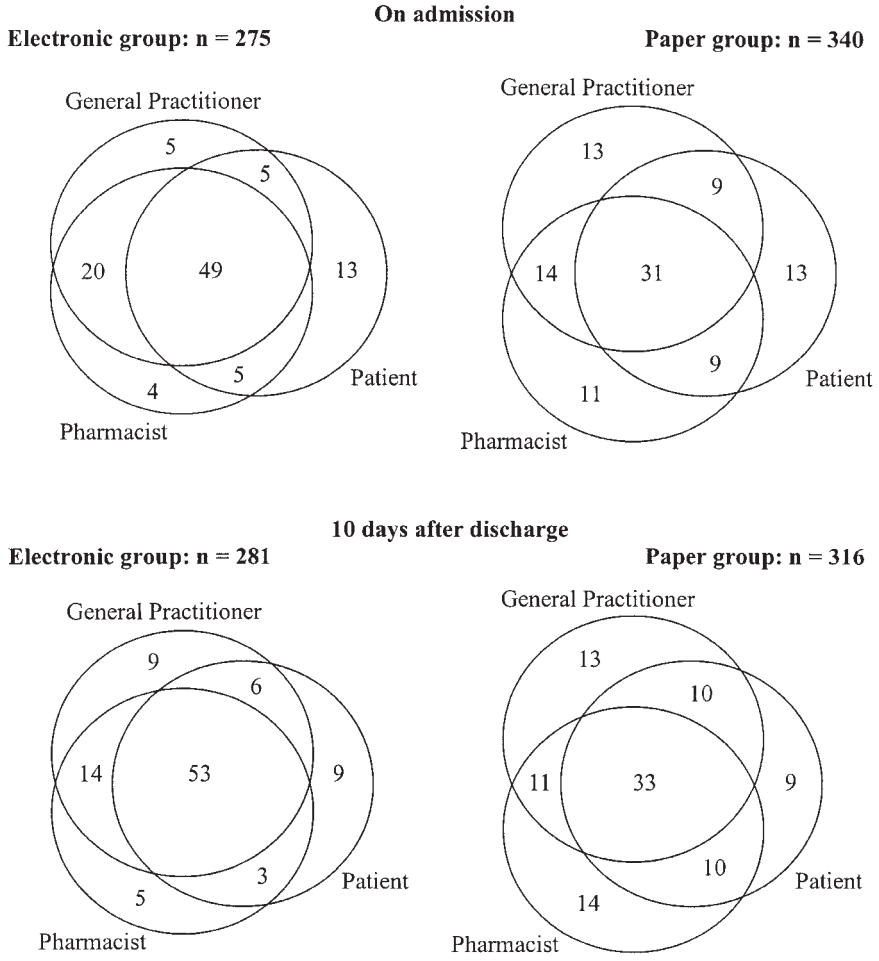

FIGURE 1 *The percentage of agreement among the patient, GP and pharmacist for the drugs reported by all three categories on admission and 10 days after discharge*

TABLE 2 *The five most frequent drugs (number of times mentioned) reported by the patient and not reported by the patient cumulated on admission and 10 days after discharge*

	Electronic group	Paper group
Reported by the patient	*n* = 396 B01AC06 Aspirin (18) C07AB02 Metoprolol tartrate (17) B04AB01 Simvastin (13) C01DA08 Isosorbide dinitrate (10) B01AA07 Nicoumalone (10)	*n* = 408 C07AB02 Metoprolol tartrate (23) B01AC06 Aspirin (21) B01AC08 Carbaspirin calcium (16) B01AA07 Nicoumalone (15) A02BC01 Omeprazol (12)
Not reported by the patient	*n* = 160 N02BE01 Paracetamol (7) B01AC06 Aspirin (5) S01BC03 Diclofenac (4) C08CA05 Nifedipine (4) C08DA01 Verapamil (4)	*n* = 248 B01AC06 Aspirin (12) M01AE01 Ibuprofen (11) R03AC02 Salbutamol (11) C01DA02 Glyceryl trinitrate (10) N05BA04 Oxazepam (10)

reported by the GP, the community pharmacist and the patient. Our study confirms other research which also reports the discrepancy between information obtained from the patient, the physician and the pharmacist.[5,8] The discrepancies between current medication as reported by the patient and that reported by the GP or the pharmacist is not limited to OTC (over the counter) products. The patients did not report important drugs,

such as, for example, glyceryl trinitrate, nifedipine, salbutamol and verapamil.

In the electronic group, the GP and the community pharmacist share their information concerning drugs. We therefore expected a nearly total agreement between them, but agreement between the GP and the pharmacist was observed in only 79% of the drugs on admission of the patient. Possible reasons for this disagreement when electronic communication is available include failure consistently to record changes (e.g. during house calls), failure to code the discontinuation of drugs explicitly (e.g. the GP records changes in medication in free text) and patient non-compliance (e.g. the pharmacist recognizes that the patient is not filling his or her prescriptions regularly). Further research has to clarify the mechanisms involved.

From a practical viewpoint, our study underscores the problems faced by the staff of a hospital when a patient is admitted. Reliable information on current medication is essential, but hard to obtain. When the patient is not able to answer questions, alternative sources such as the GP or pharmacist can be called upon. Our study indicates that the hospital staff will then receive information that includes drugs that would not have been reported by the patients themselves. In addition, other drugs the patient would have reported will not be reported. Although electronic communication between the GP and the pharmacist will improve the agreement of data between them, the agreement between the patient and care providers is not influenced. Besides, it does not matter which of the care providers is called by the hospital staff when a patient is not able to communicate with the staff.

We would point out that the findings of this study are probably optimistic; we did not include patients during weekend and night shifts, and the patients originate from geographically well-defined areas where the same pharmacist is always available to fill the prescriptions. In towns, where patients may visit different pharmacists, we would expect poorer results. We also wish to point out that an observational design without randomization of practices limits the conclusions.

In summary, we conclude that electronic communication has improved the quality of data on the current medication as reported by the GP and the pharmacist. Electronic communication, however, does not suffice to obtain reliable information. Further research will have to study the impact of additional measures aimed at improving communication.[16]

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