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ORIGINAL ARTICLE

Early experiences with the multidose drug dispensing system – A matter of trust?

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Abstract

Objective. To study early experiences with multidose drug dispensing (MDD) among different groups of health personnel. *Design.* Qualitative study based on focus-group interviews. *Setting.* Primary health care, Trondheim, Norway. *Main outcome*. The importance of trust in the technology and in collaborating partners is actualized in the early implementation of MDD. *Results.* GPs, home-care nurses, pharmacists, and medical secretaries trusted the new MDD technology. The quality of the GPs' medication records improved. However, health personnel, including the GPs themselves, would not always trust the medication records of the GPs. Checking the multidose bags arriving from the pharmacy was considered unnecessary in the written routines dealing with MDD. However, home-care nurses experienced errors and continued to manually check the bags. Nurses in the home-care service felt a loss of knowledge with regard to the patients' medications and in turn experienced reduced ability to give medical information to patients and to observe the effects of the drugs. The home-care services' routines for drug handling were not always trusted by the other groups of health personnel involved. *Conclusion.* Health personnel faced some challenges during the implementation of the MDD system, but most of them remained confident in the new system. Building trust has to be a process that runs in parallel with the introduction of new technology and the establishment of new routines for improving the quality in handling of medicines and to facilitate better cooperation and communication.

Key Words: *Drug packaging, family practice, home-care services, information sharing, medication errors, medication records, pharmacy, trust*

Multidose drug dispensing (MDD) is a "new" expansive field in the Scandinavian countries, both in the community care settings and in the nursing home setting. MDD is recommended by health authorities, motivated by expected savings in terms of medication dispensing errors and drug expenses [1–3]. However, scientific evaluations are missing [3,4]. MDD implies that the patient receives drugs machine-dispensed into one unit for each dose occasion, packed in disposable bags. The dose unit bags are labelled with patient data, drug contents data, and time for intake [5–7].

MDD was implemented in the home-care services in Trondheim, Norway, in 2006. The implementation was accomplished in a complex organization including pharmacies, home-care services, and GPs' offices. At the time of implementation the home-care services were organized into 27 home-care divisions in four town districts. A total of 137 GPs participated, and five pharmacies were involved as MDD providers. The home-care service administrated drugs for approximately 1800 out of 3000 patients receiving home-care. One of the major suppliers of multidose drugs in Norway was responsible for the production of the new drug packages and distributing them to the pharmacies. In addition to dispensing the patients' multidose drugs to the different home-care divisions, the pharmacies were also charged with updating the medication record in the multidose provider's database and making reviews of

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Trust is an important issue for health personnel in an early phase of the implementation of a multidose drug dispensing (MDD) system:

- Trust in the MDD system was challenged by medication records being outdated and the loss of flexibility in choosing and dosing drugs.
- Changes in routines and roles required a higher level of trust between professionals.
- Home-care nurses feared a loss of competence in following up patients and drug effects because of reduced time spent on medications.

the patients' prescriptions whenever changes were made by the GP (in addition to an annual review).

A project group was appointed to prepare and assist the implementation process. Information dissemination was emphasized to create involvement, motivation, and commitment among the users. It was also requested that the home-care divisions and the pharmacies appointed a specific MDD contact person to function as a contact point for the different organizations.

Unlike most other municipalities using MDD in Norway, Trondheim decided to use the GP's medication record in the electronic health record (EHR) as the master medication record. Hence, other health personnel had to update the medication record in their own EHR in accordance with the GP's medication record. Only the patient's GP was allowed to prescribe drugs to be included in the multidose drug packages.

The aim of this project was to study early experiences amongst the different groups of health professionals participating in the implementation of the MDD system. Several significant issues were brought up during the interview sessions but, already at an early stage of analysing the data, trust stood out as an important concern in all groups. In this article we have explored in depth the users' experiences with the MDD related to trust –in terms of both trust in the MDD system and trust within and between groups of collaborating health personnel. The users' experiences with the MDD system covered the handling of drugs from prescribing to administration of drugs to the patient.

Material and methods

Four focus-group interviews were carried out in March 2007, about one year after the introduction of MDD. We performed a careful selection of health personnel with varied MDD experience; the selection spanned different workplaces and personnel with different roles in the handling of MDD, thus obtaining data-source triangulation [8]. The four groups contained six home-care nurses, five pharmacists, six GP medical secretaries, and seven GPs. The focus-group interviews lasted from 70 to 110 minutes.

A master's student in sociology, trained in conducting focus-group interviews, opened and moderated the interviews. The moderator used an interview guide tailored to each group, but with some themes common to all of the groups (Table I). During the interviews the informants shared experiences and reflections related to the implementation and use of MDD. The interviews were observed and videotaped by the first author. Afterwards the interviews were transcribed verbatim by the moderator and checked by the first author.

Data were analysed by the authors through systematic text condensation, an approach described by Giorgi [9] and modified by Malterud [10]. We started the analysis by using the themes from the interview guide as point of departure for defining key categories. However, the issue of trust distinguished itself as a theme that was raised by many of our informants. This led us to adopt trust as a governing idea throughout the analysis. This emphasis on trust from the informants when reflecting on their experiences with MDD is thus a result in itself, but was also used to structure our analysis.

Observation triangulation was achieved through independent analysis of the transcribed interviews by

Table I. Themes in the interview guides and example questions from the focus-group interviews.

Themes	Example questions
Implementation and organizational development	How did the implementation of multidose progress?
	How did the implementation change the distribution of work at your workplace?
Cooperation and communication	How is the flow of information between you and the home-care service? (question directed to doctors, medical secretaries, and pharmacists)
	What can be improved with regard to communication?
Patient safety and time use	In what way does use of the multidose dispensed drugs influence patient safety?
	Do you take up more time on patients after the implementation of MDD? Why/why not? (question directed to nurses in the home-care services)

the three authors [8]. The first and third author have extensive clinical experience in the field as a community pharmacist and former GP, respectively. In addition the second and third author have experience from research on collaboration in health care as respectively a social scientist and a public health researcher.

Results

Trust – both in the MDD system and in colleagues – was a central issue for all the informants when discussing their experiences related to MDD.

Trust in the MDD system

Most of the participants expressed positive attitudes towards the MDD system, and frequently – either directly or indirectly – related it to trust. In general it was expected that the MDD system would lead to more trustworthy handling of drugs and fewer dispensing errors, as illustrated by the following quote:

> *I know someone … who told me that the mother became completely healthy when she began with this [multidose dispensed drugs]. She stopped the stumbling and lurching and everything. So it turns out that she must have been mixing. She became a new person…. Because when she got what she was supposed to get, at the right time … it didn't take long … before they said, "now, she is in such good health".* (Medical secretary)

However, one of the nurses explained that they kept on checking the multidose drug packages as they arrived from the pharmacy. This was done even though it was considered unnecessary in the written routines handed out with the implementation of MDD and may indicate that they did not really have complete trust in the MDD system after all.

Prescriptions of drugs with an interim change in dosage and as an interim cure were considered problematic in the MDD system, as was handling of warfarin:

> *… when it comes to short adjustments of medications and adjustments of furosemide in a short period or a cure, it is in many cases more difficult to go through with after the implementation of MDD. (GP)*
>
> *I think warfarin has been a difficult thing. I had a patient who had an incorrect warfarin dosage for eight weeks due to failure in MDD. And what happened I do not really know … (GP)*

The quotes indicate that the MDD system is perceived as less flexible when it comes to changes in medication/dosage than the old, manual system.

Moreover, all the groups of health personnel faced an increased need for cooperation and communication among themselves during the implementation of MDD. The fact that the MDD system required more communication and stronger involvement of the GPs and in particular the pharmacies can be interpreted as caused by health personnel not completely trusting the system. One of the GPs said that he regarded "the pharmacy as a safety net in terms of dosages to patients", illustrating the important role of the pharmacy in creating a trustworthy system for MDD.

Trust among the other groups of health personnel

Errors made in the home-care service after the implementation of MDD were reported both by pharmacists and by GPs.

> *In the case I was talking about, it was one [a home-care nurse] who gave an antidepressant that was discontinued. The doctor thought he'd try a new type, which was packaged in the MDD, but the home-care gave the other in addition.* (Pharmacist)

These and similar observations challenged the trust in the routines of the home-care services. The cooperating professions did not always trust the GP's updates to the medication record either. The medication records were needed for prescriptions of multidose drugs. Home-care nurses experienced difficulties with getting in touch with GPs in order to make them update and hand over medication records.

> *[Cooperation with] the pharmacies works very smoothly. Doctors, too, but it takes time…. That's the problem; they may not call back.* (Nurse)

The GPs and the medical secretaries confirmed the problems and blamed insufficient information and follow-up from the project group responsible for implementation. The pharmacists also experienced insufficient updates of the medication records by the GPs.

> *I called the doctor and received the prescription over the phone. Next time we got it [the medication record] the doctor had not changed it. The doctor only said yes on the phone…. That's why we agreed to get everything [new prescriptions] in writing. The doctor now faxes us.* (Pharmacist)

GPs and nurses stated that the implementation of MDD led to an increased dialogue between them

concerning which drugs should be administered "as required" (pro re nata). For practical reasons the home-care wanted as much as possible to be packed in the multidose bags while the GPs often wanted some drugs, such as sleeping pills, to be taken only when required. Both parties were content with this increased level of dialogue, as it in the end is beneficial to the welfare of the patient.

Trust within the different groups of health personnel

The home-care nurses were concerned about the reduction in manual dispensing of drugs. They feared that this would decrease their knowledge of patients' health in relation to his/her drug intake, and make them, as a group, less trusted concerning these questions. A nurse said:

> *I guess we had better overview before [the introduction of MDD]…. Now, of course we have lost it, and then I think in the long run I will lose the overview over the patient's condition….Also, when you sit and dose medicines manually, you think and reflect on the patient you are dosing for…. Then you sit and think about how it works for him and: "This should have been checked, and is it really necessary to take this [drug]?" Now I hardly reflect on it, and that's a little scary.* (Nurse)

However, both the pharmacists and the GPs experienced a greater influence on drug dispensing, and they both argued for improved quality in the handling of drugs after the implementation of MDD. This happened despite the fact that the doctors admitted that not all GPs work at the same level of accuracy with regard to medication records, in effect saying that not all GPs' medication records were to be trusted:

> *… doctors have varying levels of accuracy, then. Some are very accurate and some are not. It is much more comfortable to be a stand-in for the doctors who are relatively accurate than for the others.* (GP)

The medical secretaries also confirmed this:

> *Yes, there have been changes [in drug prescriptions] and in and out of hospital, they [GPs] need to update them [the medical records] then. They have not always been so good at it previously.* (Medical secretary)

The GPs believed that electronic communication could improve the exchange of information and updating, and thus produce an even better effect from the MDD system.

Discussion

This study has demonstrated that health personnel preserved trust in the MDD system even if the system caused new errors and changes to the routines and roles of the health personnel involved. The impact of healthcare professionals' attitudes towards the new system and views concerning their own and others' roles are likely to affect the implementation process and outcome.

Limitations of the study

Focus-group interviews were conducted to get a better understanding of the attitudes and experiences among involved health personnel in relation to implementation of MDD in the home-care services [11]. The results stem from a single implementation and any generalization of the findings should be made cautiously. Successful implementation of a new technology in one organization might well become a failure in another [12].

The first author was observing the interviews. She was also a member of the project group responsible for the implementation of MDD and has been a community pharmacist engaged in researching methods to reduce the number of medical errors in primary care. This might have influenced how the participants expressed their attitudes towards the MDD system and the implementation process, as well as the role of pharmacists. Observer triangulation was used to diminish this risk of bias.

The timing of the interviews in relation to the implementation process also has to be considered. In an early phase of implementation, engagement and an optimistic attitude may influence the way the people involved describe a new system [13]. However, later on they might have adapted to problems by way of "work-arounds" [14].

New technology and the significance of trust

The issue of trust stands out as important in respect of any system implementation [15]. The details surrounding the MDD system are mostly invisible to the health personnel, and the work put into it is to some extent also separated in both time and space from the end-users. Hence it may be understood and analysed as an abstract (expert) system [16]. In addition, the implementation of systems and concurrent reorganization of work raise the issue of trust in colleagues. This makes it important to understand the relationship and interplay between system trust and personal trust to be able to understand the intra-organizational implementation process [17].

We would argue that trust in the MDD system and the new professional roles were established through the implementation process. The implementation project succeeded in involving the affected health personnel in the planning of the new system. It established responsibility as well as new uniform collaboration routines. These are important success factors, as underlined by others who have studied implementation of MDD systems [4,18]. However, we have not been able to find any other studies explicitly discussing trust as an issue in drug dispensing.

The informants indicated a common expectation for the MDD system to reduce the discrepancies between medication records at the GPs' practices and in the home-care services. In a parallel study undertaken by the authors, their expectations were largely confirmed [19]. Even so, health personnel remained confident in the new system even when coming across new types of errors caused by the introduction of MDD. Unfortunately, the introduction of new errors is quite common when new technology or changes in routines are introduced [20–23].

GPs indicated that they were content with the introduction of MDD. We know from earlier studies that GPs are not always conscientious in keeping up their medication records [24–26] and this was also reaffirmed through the interviews. The GPs as well as the medical secretaries would not always trust the medication records of their GP colleagues. Some patients are well known to their GPs through continuous and frequent encounters over time and studies have shown that GPs are very rational both with regard to how and with regard to what they document for their own sake in the EHR [27]. On the other hand, the GPs were pleased with the new and more extensive cooperation with the pharmacy introduced by MDD. A recent study on the value of physician/pharmacist/nurse cooperation in nursing homes has shown impact on optimizing medication use [28].

Nurses were anxious about losing their skills as good observers of patients. One could attempt to compensate for uncertainty in new technology either by keeping up old routines in parallel, or by trying to find other ways of obtaining the same information [13]. Additionally, the tasks that belong to their role are many and integrated. Planners sometimes underestimate the extent to which taking away one task might have unintended and negative effects on others [20]. The nurses might be justified in expressing scepticism towards the new system [29]. On the other hand, some would claim that the discontent from the nurses is more about the protection of their own role rather than scepticism towards the MDD system.

Future research

The nursing role has previously been described as the last defence in a safety net to prevent errors [30]. Our group of nurses reported that less attention was paid to medications after the introduction of MDD. Instead the pharmacy was highlighted as a new safety net. More research is needed to look into the consequences of this potential change in responsibility. The significance of new types of errors following the introduction of MDD also needs further investigation.

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Ethics

The study was approved by the Regional Committee for Medical Research Ethics (REK) and the Norwegian Data Inspectorate (NSD).

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Competing interests

The authors declare no competing interests.

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