Original Research

Health care professionals' perspectives on automated multi-dose drug dispensing

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ABSTRACT[*]

Background: During the 1980s, manual repackaging of multi-dose medications from pharmacies in Sweden was successively substituted with automated multi-dose drug dispensing (MDD). There are few studies evaluating the consequences of automated MDD with regard to patient safety, and those that investigate this issue are not very extensive.

Objectives: To investigate Swedish health care professionals' perceived experience of automated MDD and its effects on patient adherence and patient safety.

Methods: Three questionnaire forms, one for physicians, nurses, and assistant nurses/nursing assistants, were developed based on reviews of the literature and pilot testing of the questions in the intended target groups. The target groups were health professionals prescribing or administrating MDD to patients. A sample (every sixth municipality) was drawn from the sampling frame of Swedish municipalities, resulting in 40 municipalities, about 14% of all municipalities in Sweden. Email addresses of general practitioners were obtained from county councils, while the municipalities assisted in getting contact details for nurses, assistant nurses and nursing assistants. A total of 915 questionnaires were distributed electronically to physicians, 515 to nurses, and 4,118 to assistant nurses/nursing assistants. The data were collected in September and October 2012.

Results: The response rate among physicians, nurses and assistant nurses/nursing assistants was 31%, 43% and 23%, respectively. The professionals reported that automated MDD reduces duplication of medication, contributes to correct dosages, helps patients take their medication at the right time, and reduces confusion among patients. Fifteen per cent of the physicians and about one-third of the nurses and assistant nurses/nursing assistants reported that generic substitution makes it more difficult for the patient to identify the various medicines available in the sachets. The physicians did, however, note that prescribing medicine to patients with automated MDD is complicated and can be a risk for patient safety. Both physicians and nurses requested more information on and training in automated MDD. They also asked for more medication reviews.

Conclusions: The professionals generally had a positive attitude to automated MDD with regard to improved medication adherence, but said they believed that the electronic prescribing system posed a safety risk for patients.

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INTRODUCTION

Medication errors and non-adherence to prescribed treatment are common and generate both much suffering and high costs. In 2012 the Swedish government mandated the Medical Products Agency to investigate whether automated multi-dose drug dispensing (MDD) had an impact on patient safety and non-adherence.

In 2011 about 180,000 individuals in Sweden received their prescribed medicines via automated MDD from pharmacies. About 80% of them were 65 years or older, corresponding to 8% of this age group in Sweden, varying from 6% to 11% between counties. About 40% lived in ordinary housing, while about 60% lived in care home for the elderly. Of the recipients living in ordinary housing, the majority (about 50,000) had assistance with delivery of medicines from the pharmacy from municipal professionals (elderly care/social care or primary health care). Because of impaired physical or cognitive function and difficulties in handling the medication, the majority of these elderly also had assistance with medicine handling figures according to The Swedish Corporation of Pharmacies, 2013.[1]

With automated MDD, solid medications (tablets and capsules) are machine-dispensed together into disposable sachets for each scheduled administration occasion (Figure 1). The sachets are individually labelled with patient data (name and identification number), dispensed medication in the sachet (name, strength and number of doses), and date and scheduled time for administration.[2-5] Usually, a delivery contains medication for 2 weeks.

Figure 1. automated multi-dose drug dispensing

Medicines that cannot be dispensed into sachets (solid medicines that are not licensed to be repackaged, as well as liquids, and parenteral or topical formulations) are delivered in their original packaging from the manufacturer (i.e. the pharmaceutical company) in a quantity agreed with the patient (at maximum 3 months' treatment).

Multi-dose drug dispensing is reimbursed and covered by the Swedish Pharmacy Benefit. This drug dispensing system has also been introduced in other European countries, such as Denmark, Finland, Germany, The Netherlands and Norway.

During the 1980s, manual repackaging of multi-dose medications from the pharmacy was successively substituted with automated MDD in Sweden. At the time, this was mainly a service to county council-managed nursing homes. The demand for the service was based on safety and time-saving issues. The common experience was that errors in medication delivery and administration were common when medicines were repackaged by ward staff from a common ward stock from department medicine storage. However, formal studies on the issue were absent and have only been published recently.[6,7]

In 1992 the administrative and financial responsibility for the former nursing homes was transferred to the municipalities and included in the municipalities' portfolio for "special housing for the elderly" in Sweden. The municipalities were offered three alternatives for medicine handling. They could either continue preparing or repacking medicines into dosage administration aids (DAAs) from a medicine stock, with generic packaging used at the department; or have the medicines individually prescribed, dispensed in packs as supplied by the manufacturers; or use automated MDD.

Individually prescribed medicines (using prescription forms) were reimbursed and included in the Swedish Pharmacy Benefit. The costs for reimbursed medicines were borne by the government at a national level. However, the municipalities would have to cover all costs for the medications if they prepared and/or repacked medicines into DAAs from a medicine stock using generic packaging. Deliveries of multi-dose drugs, using automated MDDs, from the pharmacies implied time and cost saving among ward staff. As a consequence, almost all municipalities in Sweden, in order to cut labour costs for nursing staff, increasingly ordered automated MDDs from pharmacies. However, in one of the country's 21 counties, the preparing and/or repacking of medicines into DAAs from a medicine stock at the department using generic packaging was continued. On 1 January 1997 the cost for the Swedish Pharmacy Benefit was transferred from the national, government level to the county councils. The counties then applied different models with more, or less, decentralized medicine budgets and limits for utilization of automated MDD.

Multi-dose drug dispensing can only be prescribed by a physician, most often a general practitioner, often following the suggestion or recommendation of a municipal district nurse. The patient's total medication (including over-the-counter medication the patient may have along with prescribed medicines) is then transferred to (and thereafter prescribed in) a separate national prescribing database which is accessible to all prescribers and pharmacies. The information in the database may also be presented on a special list with all of the patient's current medications. The list is distributed to the nurse responsible for handling of the MDD medications at nursing homes and to patients living at home in need of this service. A renewal of the prescribed medications in the database is mandatory every 12 months.

Until 2010 all the Swedish pharmacies were own and managed by the National Corporation of Swedish Pharmacies. In 2010, two-thirds of the pharmacies of were sold out to private enterprises. However, until the beginning of 2013 only the National Corporation of Swedish Pharmacies offered automated MDD. Since the spring of 2013, other companies in Sweden have also been offering this service.

Evaluation of medicine dispensing for DAAs is limited.[8-12] However a few studies have outlined some potential factors contributing to DAA dispensing errors.[8-12] Inadequate communication amongst members of the health care team, illegible medicine records and concentration lapses or fatigue experienced during DAA preparation have been suggested.[9-12]

To the best of our knowledge there are no conclusive studies with regard to patient safety and adherence using automated MDD. However, some Swedish studies have indicated an association between poor quality of drug treatment among the elderly using automated MDD compared with medicines prescribed and dispensed individually in the manufacturers' packs from pharmacies.[13,14] Comprehensive literature reviews reveal that studies comparing automated MDD from pharmacies with medicines prescribed and dispensed individually in manufacturers' packs from pharmacies are few and inconclusive.[15,16] In Norway, different health care professionals have been surveyed to obtain information about confidence in automated MDD.[17,18] In a study from the Netherlands, it was reported that community-dwelling recipients of MDD have better medication adherence but poorer medication knowledge compared with age- and sex-matched recipients of manual medication dispensing.[19] Other studies have examined the economic benefits and the time saved by health care personnel in connection with automated MDD use.[20] More studies on automated MDD are needed to ensure the quality of drug treatment among those receiving their medicines packed in sachets.

The aim of this study was to investigate Swedish health care professionals' perceived experience of automated MDD and its effects on patient adherence and patient safety.

METHODS

Three questionnaire forms, one for each personnel category, were developed based on review of the literature and pilot testing of the questions in the intended target groups. The questionnaires were entered into a website (QuickSearch®).[21]. The target groups were physicians, nurses, and assistant nurses/nursing assistants involved in the prescribing and/or administration of MDD for patients. The assistant nurses/nursing assistants have a 2-year education in health and social care at high school level. The responsibility for a patient's drug administration can be delegated by the responsible nurse to the assistant nurse/nursing assistant.

The survey included both questions, as well as different statements about automated MDD.

The respondents could select one or several alternatives from a list following the questions "What are the reasons for receiving automated multi-dose drug dispensing?", "Who is suitable for automated multi-dose drug dispensing?" and "How can multi-dose drug dispensing be improved?". They could also add comments to the questions. The question "Do you consider that more patients should be offered automated MDD? "was followed by the statements" Yes, more patients than those currently receiving it need the service? , " No, those who need the service are also offered it?" , "No, there are patients currently on automated MDD who do not need the service?" There was also a possibility to add comments to this question.

The professionals stated whether they "fully agree", "largely agree", "partly agree", "disagree" or "do not know" on the following statements: "automated MDD reduces duplication of medication", "automated MDD contributes to correct dosage", "automated MDD limits my time with the patient/caregiver", "the sachets help the patients/caregiver to take/give the medication at the right time", "it is a patient safety risk that patients have medicines in both sachets and other packages", "automated MDD makes it easier for me to know which medicines the patient is prescribed", "the patients I am responsible for are not offered medical reviews at prescription renewal", "automated MDD prevents the patients from getting confused with various medicines", "automated MDD allows the patient/caregiver to become more involved in decisions about their/the patient's treatment", "it is less secure that the patient/caregiver receives medicine in sachets", "generic substitution makes it easier for the patient to identify the various medicines available in sachets", "sachets are safer than dosettes". In the analyses the statements were classified into "fully agree/largely agree", "partly agree", "disagree" or "do not know". Those who "fully agree/largely agree" are presented in the results.

Data collection

Information on municipal sizes was collected from Statistics Sweden. A sampling frame was set up including all Swedish municipalities (sorted by population size). A systematic sample (every sixth municipality) was drawn from the sampling frame, resulting in 40 municipalities.

County councils helped to obtain email addresses of general practitioner, while the municipalities assisted in obtaining contact details for nurses, assistant nurses and nursing assistants. Email addresses were obtained from 18 municipalities. Five of these were "medium-sized" (55,000-200,000 inhabitants) and 13 were "small" (7,000-10,000 inhabitants). The remaining 22 municipalities did not submit email addresses for various reasons such as lack of time to obtain these, the responsible persons being on holiday, or unwillingness to disclose information about members of staff. The total numbers of email addresses obtained were 5,067 for assistant nurses/nursing assistants, 568 for nurses, and 1,026 for physicians.

A cover letter with information about the study and an invitation to participate, stating the website (URL) for the survey (QuickSearch®), was distributed via email to the respondents. The study was approved by the regional board for ethical vetting of research in Uppsala, Sweden (No. 2012/289). The consents were implied by return of the questionnaires. Two reminders were sent, 1 week apart. Because of incorrect email addresses, or because some persons had left their job at the municipality or county council, or else because spam filters stopped the mailings, not all emails were successfully received, despite attempts to correct addresses and get past the filters. A total of 4,118 emails were distributed to assistant nurses/nursing assistants, 515 to nurses, and 915 to physicians. The data were collected in September and October 2012.

RESULTS

A total of 284 physicians responded to the questionnaires, which corresponds to a response rate of 31%. Sixty-one questionnaires were excluded because only personal characteristics had been completed or because the responding doctor prescribed automated MDD less often than once per month, giving 223 responses and a response rate of 24%. Among nurses, 43% responded to the questionnaires. Nine questionnaires were excluded because of few contacts with patients with automated MDD, giving 215 responses, which corresponds to a response rate of 42%. The response rate among assistant nurses/nursing assistants was 23%. Fifty surveys were excluded because of too few contacts with patients with automated MDD, giving a remaining 915 responses, which corresponds to a response rate of 22%.

Gender distribution among the respondents varied by occupational group. Among the physicians, 53% were women and 47% men. Forty-six per cent of the physicians were 26–44 years old, 44% were 45–64 years old, the minority being 65–74 years old. Among the nurses and assistant nurses/nursing assistants, the majority were women (93% and 94%, respectively). Almost 70% of the nurses were in the age group 45–64 years, 29% were 27–44 years and the rest were 65–74 years old. Almost 60% of the assistant nurses/nursing assistants were in the age group 45–64 years.

Table 1. Number and percentage of health care professionals who selected items following the question "What are the reasons for receiving automated multi-dose drug dispensing MDD?" (several items could be selected).

Statement	Physicians, N=223 n (%)	Nurses, N=215 n (%)	Assistant nurses/nursing assistants N=915 n (%)
The patients receive automated MDD to improve medication adherence	135 (60)	112 (52)	281 (31)
Automated MDD is for patient who cannot manage their medicine by themselves	185 (83)	167 (78)	637 (70)
Automated MDD is prescribed to increase patient safety	132 (59)	193 (90)	678 (74)
Automated MDD is mainly offered for the convenience of the staff	147 (66)	165 (77)	548 (60)
Automated MDD is offered in order to have an overall picture of medicine prescription	45 (20)	99 (46)	175 (19)
Automated MDD is suggested by relatives	52 (23)	35 (16)	81 (9)
Automated MDD is suggested by the patient	49 (22)	26 (12)	94 (10)

What are the reasons for receiving automated multi-dose drug dispensing? The majority of the nurses (90%) and nurses/nursing assistants (74%) stated that automated MDD is prescribed to increase patient safety but only 59% of physicians said so (Table 1). Nearly 80% of the nurses responded that automated MDD is for patients who cannot manage their medication by themselves. The majority of nurses and nursing assistants (70%) and physicians (83%) also said so. The majority of the nurses (77%), doctors (66%) and nurses/nursing assistants (60%) thought that automated MDD is mainly offered for the convenience of the staff. Half of the nurses responded that patients receive automated MDD to improve medication adherence. The corresponding percentage for physicians was 60% and for assistant nurses/nursing assistants 31%. Of the nurses, 46% reported that MDD is offered in order to have an overall picture of medicine prescriptions. One-fifth of the doctors and assistant nurses/nursing assistants answered the same. About one-fifth of the physicians reported that MDD was suggested by the relatives or by the patients themselves. The corresponding percentages for nurses were 16% and 12%, and for assistant nurses/nursing assistants 9% and 10%.

Who is suitable for automated multi-dose drug dispensing? The majority of physicians (80%) responded that patients with poor memory are a patient group that are suitable for automated MDD (Table 2). The majority also reported that patients with stable medication where prescription does not change often, patients with many medicines, and patients with poor adherence to prescribed treatment are suitable for automated MDD.

More than 80% of the nurses responded that automated MDD is particularly suitable for patients on stable medication, as well as patients with many medicines. More than 70% said that automated MDD is suitable for patients with memory problems. About 60% responded that automated MDD is suitable for patients with difficulties to open their medicine packages and patients with poor adherence to the prescribed medication.

Most assistant nurses and nursing assistants (70%) responded that automated MDD is appropriate for patients with many medicines, and patients with memory deficiencies. About 60% responded that automated MDD is suitable for patients with difficulties to open their medicine packages. More than half of the responding assistant nurses and nursing assistants responded that automated MDD is particularly suitable for patients on stable medication.

Who should be offered the service? Half of the responding physicians commented that all patients who are suitable for automated MDD should be offered the service; however, one-third of physicians responded that many of the patients currently on automated MDD do not need this service. The doctors mentioned limitations of automated MDD as the system may reduce the patient's involvement in the medication. They also commented that more patients could be offered the service but that the prescribing system was so arbitrary and difficult to manage that this would pose a safety risk to patients.

Among the nurses, approximately 70% reported that those patients who need automated MDD should be offered the service. About 50% said that more patients than those currently receiving it needed the service. They commented that some patients are not offered automated MDD because physicians are negative to the system for economic reasons.

Table 2. Number and percentage of health care professionals who selected items following the question "Who is suitable for automated multi-dose drug dispensing?" (several items could be selected).

Statement Automated MDD is suitable for patients:	Physicians, N=223 n (%)	Nurses, N=215 n (%)	Assistant nurses/nursing assistants N=915 n (%)
with stable medication where prescription does not change often	158 (71)	179 (83)	486 (53)
with abuse problems	116 (52)	61 (28)	218 (24)
suicidal patients	21 (9)	33 (15)	135 (15)
with poor memory	179 (80)	153 (71)	637 (70)
with difficulties to open their medicine package	115 (52)	142 (66)	555 (61)
with chronic diseases	67 (30)	65 (30)	186 (20)
with many medicines (>5)	164 (73)	187 (87)	648 (71)
with poor adherence to prescribed treatment	147 (66)	128 (59)	265 (29)

Table 3. Number and percentage of healthcare professionals who responded "fully agree/or largely agree" to listed statements about automated multi-dose drug dispensing (MDD).

Statement	Physicians (N=223), n(%)	Nurses (N=215), n (%)	Assistant nurses/nursing assistants (N=915), n (%)
Automated MDD reduces duplication of medication.	140 (63)	187 (87)	745 (81)
Automated MDD contributes to correct dosage.	155 (69)	203 (94)	761 (84)
Automated MDD limits my time with the patient/caregiver.	73 (33)	5 (2)	15 (2)
The sachets help the patients/caregiver to take/give the medication at the right time.	160 (72)	195 (90)	735 (80)
It is a patient safety risk that patients have medicines in both sachets and other packages.	114 (52)	78 (37)	306 (33)
Automated MDD makes it easier for me to know which medicines the patient is prescribed.	–*	192 (90)	745 (82)
The patients I am responsible for are *not* offered medical reviews at prescription renewal.	35 (16)	34 (16)	214 (23)
Automated MDD prevents the patients from getting confused with various medicines.	156 (70)	190 (88)	682 (74)
Automated MDD allows the patient/caregiver to become more involved in decisions about their/the patient's treatment.	9 (4)	39 (18)	149 (16)
It is less secure that the patient/caregiver receives medicine in sachets.	17 (7)	8 (4)	43 (4)
Generic substitution makes it easier for the patient to identify the various medicines available in sachets.	33 (15)	80 (37)	327 (36)
Sachets are safer than dosettes.	19 (8)	189 (89)	73 (81)

*This statement was not presented to the physicians.

Does automated multi-dose drug dispensing contribute to improved medication adherence and patient safety? The professionals in general had a positive attitude to automated MDD with respect to its contribution to better adherence and improvement of patient safety (Table 3). They answered that automated MDD reduces the risk for duplication of medication, contributes to correct dosing, helps patients to take their medication at the correct time, and reduces confusion among patients. The nurses were the most positive, with 87–94% agreeing with the various positive statements about automated MDD. Among the assistant nurses/nursing assistants and the physicians, 74–84% and 63–72%, respectively, agreed with these positive statements.

One-third of the physicians, but not the nurses and assistant nurses/nursing assistants, reported that automated MDD limits their time with the patients. More than half of the physicians commented that it is a safety risk to give patients medicines in both sachets and other packaging. One-third of the responding nurses and assistant nurses/nursing assistants agreed with this. The majority of the nurses and assistant nurses/nursing assistants reported that automated MDD makes it easier for them to know which medicines have been prescribed.

Sixteen per cent of the responding physicians and nurses, and 23% of the assistant nurses/nursing assistants responded that patients are not offered medication reviews at prescription renewals. A small minority of physicians, 18% of nurses and 16% of assistant nurses and nursing assistants responded that automated MDD allows the patient/caregiver to become more involved in decisions about their/the patient's treatment.

Fifteen per cent of the physicians and one-third of the nurses and assistant nurses/nursing assistants agreed with the statement that generic substitution makes it easier for the patient to identify the various medicines in the sachets. In the open-ended comment field, the physicians reported that generic substitution made it more difficult for many people to handle their medications. The nurses commented that they had difficulties identifying the different tablets due to generic substitution.

How can multi-dose drug dispensing be improved? About 44% of the physicians reported that the opportunity to communicate with the pharmacies could be improved. One-third of the nurses and one-fifth of the assistant nurses and nursing assistants agreed with this statement. Over one-third of all responding professionals (31–44%) noted that the reminders, both to health care professionals and to the patients, to renew the prescription need to be improved. About 60% of physicians commented that the system needs to be quicker to respond to medication changes. The majority of nurses (55%) reported that there is a need for enhanced cooperation to minimize medical errors in the transition from hospital to primary and community care. Both nurses and assistant nurses/nursing assistants (37%) said that the quality and design of sachets needs to be improved.

The physicians commented that the new prescribing procedure for automated MDD is complicated and poses a risk for patient safety. Both physicians and nurses responded that the electronic prescription system could be more user-friendly. They requested more information and training on automated MDD. They also responded that there is a need for improvements in the electronic prescribing system regarding the cessation of medicines.

The nurses commented on the importance of there being only one medication list. They further said that prescribing needs to be improved in various respects, that more patients should be offered automated MDD, and that the benefits of automated MDD for younger people with disabilities need to be highlighted.

Nurses and assistant nurses/nursing assistants mentioned that delivery logistics as well as payment for the service can be improved, that dosing printed on the sachets should be followed and not changed without consulting the physician, that there should be information on the sachets about which tablets may be crushed, that the quality of sachets needs to be improved, that the patient and caregiver should be informed when the name, colour or other appearance of the tablets are changed, and that training in medicine management should be given to nursing assistants/assistant nurses as it is this group who manage the medicine handling for the patients.

A few nurses also commented that "without an automated dosage system, the municipal health system would fail altogether". Nurses and nursing assistants finally mentioned that "we need more medication reviews and to become better at keeping track of which ones [patients] cannot handle their own drug treatment".

DISCUSSION

The use of automated MDD as a practical aid is related to both prescription and handling of medication. In general, the included health care professionals had a positive attitude towards automated MDD regarding the system's contribution to improved medication adherence and patient safety. Nurses and nursing assistants/assistant nurses commented that automated MDD should be offered to more patients. Previous surveys and interview studies have likewise shown that of health care professionals, nurses are the most positive to automated MDD as it facilitates the handling of medicines.[22] Physicians are, as we also found in this study, more critical to the system. In a qualitative Norwegian study, however, it was found that physicians responded that they had a better overview of the medicines patients were prescribed and that medication errors were reduced by automated MDD though their workload was increased.[23]

The majority of the professionals reported that automated MDD is suitable for patients with memory deficiencies, patients on a stable medication where medicines are not often changed, patients with many medications, and patients with poor adherence to the prescribed treatment. Most of the nurses and assistant nurses/nursing assistants also responded that automated MDD is suitable for patients with difficulties to open the medicine packages. In a survey in west Sweden, the most common answers to the question of which patients are suitable for automated MDD, were that stable patients who cannot handle their medication by themselves, patients with abuse problems, suicidal patients, and patients with memory deficiencies, motor difficulties, chronic diseases, many medications and poor adherence are most in need of automated MDD.[24]

About half of the nurses said that more patients than those currently receiving it needed the service. They commented that some patients are not offered automated MDD because physicians are negative to the system for economic reasons. One reason might be that the county councils are not willing to take the costs. In Sweden hospital physicians are employed by the county councils whereas general practitioners are employed by the municipalities. Several municipalities make up one county council so in either way physicians have to be very cost aware when ordering MDD service for patients. There are a maximum number of MDD services that each county council is able to offer and when this number is reached no more patients can be offered this service even if they are in need of it.

In our study we found that a large proportion of physicians and nurses felt that generic substitution hampers the patient's knowledge of which medicines the sachets contain. The patient and caregiver should be informed when the name, colour or other appearance of the tablets are changed. The cost-effectiveness of generic substitution for patients with automated MDD should be investigated. An alternative could be to exclude generic substitution for patients on automated MDD. Another option might be that the patient could be given the opportunity to refuse generic substitution.

A previous study also resulted in a number of comments on how automated MDD can be improved. For example, the anamnesis regarding ordering and cessation of medicines could be improved. Furthermore, there should be an opportunity to evaluate each medicine separately when it is prescribed and there should be a physician with a coordinating responsibility. An overview of the proposed improvements is described in detail in the activity analysis conducted in a survey in west Sweden.[24]

There is limited information in the literature on the different professionals' experience of automated MDD in terms of medication adherence and patient safety. This study aims to fill this gap to some extent. However, the study has some limitations. The systematic sample was drawn to obtain variation in the size of the included municipalities. However, email addresses were obtained from fewer than half of the selected municipalities and county councils. There was also a loss of prospective respondents as not all potential respondents received their invitations. Both these drawbacks might have induced selection bias which may have influenced the results. However, there was no other possibility to get hold of the MDD professionals' emails than actively asking them to compile the email address lists and send to us. There are no pre-existing lists of emails to professionals' working with MDD patients. This is to our knowledge not unique to the Swedish setting. Those responding to the survey may also have different opinions compare to those not responding in different ways. The results can therefore not be generalized to represent the views of all health care professionals with regard to automated MDD.

The recipients of MDD living in ordinary housing (i.e., the target group for this study) receive MDD because they have difficulties in handling the medicine for one or several reasons. They are a

selection of vulnerable patients. Hence patient safety aspects are challenging to assess. Changes in drug elimination capacities as well as difficulties remembering and handling drug administration should ideally be taken into account. However, this study contributes with new information about professionals' views of MDD. We do think that this study is a first important step in trying to access a broad range of professionals to ask them about their experiences and perceptions of MDD in relation to medication adherence and patient safety.

Further research is warranted with regard to the follow-up and evaluation of effects and safety for patients using MDD. It is important to study subgroups of current and potential future MDD users.

The focus of many of the survey questions was naturally drug treatment. However, it is reasonable to believe that responses were influenced by views on the parallel introduction of a new electronic prescribing system, Pascal™, for automated MDD. Subsequent feedback from the questionnaires shows that nurses and assistants nurses/nursing assistants consider automated MDD primarily as a medicine handling system, whereas many physicians consider automated MDD a system for both medicine prescribing and medicine handling. Interpretation of the results should be made in this context.

CONCLUSIONS

The use of automated MDD as a practical aid is related to both prescribing and medicine handling. The health care professionals in general had a positive attitude to the automated MDD with regard to improved medication adherence, but reported that the electronic prescribing system might pose a safety risk for patients. A clear position on generic substitution in relation to automated MDD was requested. The cost-effectiveness of generic substitution for patients with automated MDD should be investigated. An alternative could be to exclude generic substitution for patients with automated MDD. Another option might be that patients are given the opportunity to refuse generic substitution.

CONFLICT OF INTEREST

The authors declare that they do not have any conflict of interest.

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Ethical approval: This study has been approved by the regional board for ethical vetting of research in Uppsala, Sweden (No. 2012/289).

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PERSPECTIVAS DE LOS PROFESIONALES DE LA SALUD SOBRE LA DISPENSACIÓN DE MEDICAMENTOS EN MULTI-DOSIS AUTOMATIZADAS

RESUMEN

Antecedentes: Durante los años 1980s, el re-embalaje manual de medicamentos en las farmacias suecas fue gradualmente substituido por la dispensación multi-dosis automatizada (MDD). Hay pocos estudios que evalúen las consecuencias del MDD automatizado en relación a la seguridad del paciente, y los que lo han hecho no eran muy extensivos.
Objetivos: Investigar las percepciones de los profesionales de salud suecos del MDD automatizado y sus efectos en la adherencia y seguridad del paciente.
Métodos: Basándose en la literatura, se desarrollaron tres cuestionarios, para médicos, enfermeras y auxiliares de enfermería, y se pilotaron en cada uno de los tres grupos. Los grupos diana eran profesionales que prescribían o administraban MDD a pacientes. Se extrajo una muestra /una de cada seis) municipios del marco mostral de municipios de Suecia, obteniéndose 40 municipios, cerca del 40% de todos los que hay en Suecia. Se obtuvieron las direcciones de correo electrónico de los consejos de condado, mientras que los ayuntamientos ayudaron a conseguir los contactos de enfermeras y auxiliares de enfermería. Se distribuyeron electrónicamente un total de 915 cuestionarios a médicos, 515 a enfermeras y 4118 a auxiliares de enfermería. Los datos fueron recogidos entre septiembre y octubre de 2012.
Resultados: La tasa de respuesta entre médicos, enfermeras y auxiliares de enfermería fue del 31%, 43% y 23%, respectivamente. Los profesionales reportaron que los MDD reducen la duplicidad e medicamentos, contribuye a la correcta dosificación, ayuda a los pacientes a tomar la medicación a la hora correcta, y reduce la confusión entre los pacientes. Un 15% de médicos y cerca de un tercio de enfermeras y auxiliares reportaron que la sustitución genérica hace más difícil al paciente identificar los varios medicamentos en los sobres. Sin embargo, los médicos apuntaron que prescribir medicamentos en MDD automatizado es complicado y puede ser de riesgo para la seguridad de los pacientes. Tanto médicos como enfermeras pidieron más información y entrenamiento sobre MDD automatizados. También pidieron más revisiones de la medicación.
Conclusiones: Los profesionales en general tienen una actitud positiva hacia los MDD automatizados en cuento a la mejora de la adherencia a medicación, pero dicen que creen que la l sistema de prescripción electrónica ha creado un riesgo para los pacientes.

Palabras clave: Embalaje de Medicamentos; Sistemas de Medicación; Cumplimiento de la Medicación; Errores de Medicación; Actitud del Personal de Salud; Suecia

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