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Title

SelfMED: Self-administration of medication in hospital. A prevalence study in Flanders, Belgium.

Running head

Self-management of medication in hospital.

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Abstract

Background Self-management is a key element in regaining and maintaining health. However, during hospitalisation it becomes less obvious. Patient self-administration of medication during hospitalisation is suggested to be beneficial to the patient satisfaction, adherence to pharmacotherapy and self-care competence. **Objectives** This study aimed to examine the prevalence of self-administration of medication during hospitalisation, and possible contributing factors. **Design and setting** A cross-sectional observational study was conducted in 12 Belgian hospitals from February 2015 until June 2015. **Participants** Data were collected on all hospitalised patients at 57 wards, based in 12 hospitals. **Data collection**

A structured questionnaire at ward level and patient level on medication management, self-administration of medication and rationale for prohibiting or allowing patients to self-administer their medication was conducted in consultation with the head nurse. **Results** Of the 1269 patients participating in this study, 22% self-administered at least one medicine during hospitalisation, 13.8% self-administered at least 50% of their total amount of medication. According to the opinion of the head nurse, 40.9% of the hospitalised patients would have been able to self-administer their medication during hospitalisation. Only a few wards had an available procedure and screening tool to assess the competence of the patients to self-administer their medication. This did not affect the prevalence of self-administration. Self-administration occurred significantly more at surgical short-stay wards, compared to other wards. The self-administering patients were on average younger, female, having a lower number of different medications per day before and during hospitalisation. These patients had a good health status, and were independent to mildly dependent on nurses on the ward. Related factors were used to provide a multivariate logistic regression model. **Conclusion** Sometimes self-administration of medication was allowed. According to the surveyed nurses, however, more patients would be able to self-administer their medication during hospitalisation. There seems to be a lack of procedures and screening tools to assess the competence or appropriateness of patients to self-administer their medication. **Clinical relevance** This study provides new knowledge about the prevalence of self-administration of medication, contributing factors, the types of self-administered medications and the organisation of self-administration of medication on different wards. **Keywords** Hospitalisation, inpatients, medication, nursing, self-management, SAM

Background

In 1948, the World Health Organization defined health as ‘a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity’ (WHO,

1948). Increasing criticism on the term ‘complete’ in relation to well-being, and the complex measurement of ‘complete’ health, have resulted in a new definition of health; ‘the ability to adapt and self-manage in the face of social, physical, and emotional changes’ (Huber, 2011). As self-management is a key element in maintaining and regaining health, healthcare professionals need to support self-management.

In nursing literature, self-management of a chronic disease refers to ‘the behaviours that persons use to manage the disease and its associated effects’ (Lorig & Holman, 2003; Trappenburg, 2013). Medication use is one of these behaviours used to manage the disease and its associated effects (Miller, Lasiter, Bartlett Ellis, & Buelow, 2015).

To support self-management of medication, health care professionals have the responsibility to evaluate to what extent a patient needs assistance, to detect self-management problems, to provide the care the patient needs, and to try to improve self-management abilities. Health care professionals should not take over actions, without considering the patients’ self-management abilities. (Meleis, 2012; Orem, 2001).

However, during hospitalisation, self-management of medication is not obvious. Recently, a guideline by the Peninsula Community Health stated ‘Self-Administration of Medication (SAM) is the process where a patient, following assessment is able to administer their own medicines whilst in hospital’ (Palmer, 2014).

Inconclusive study results indicate that self-administration of medication during hospitalisation has advantages compared to administration of medication by nurses, e.g. an increased patient satisfaction and an improvement of adherence to pharmacotherapy and self-care competence. Additional quantitative data are needed (Barnason, Zimmerman, Hertzog, & Schulz, 2010; Tran, Elliott, Taylor, & Woodward, 2011; Richardson, Brooks, Bramley, & Coleman, 2014; Wright et al., 2006).

So far, prevalence rates of self-administration of medication during hospitalisation are scarce. A Belgian pilot study conducted at a medical and a surgical ward showed that 32.1% of the included patients (n= 81) self-administered at least one medicine during hospitalisation. The majority of these medications concerned oral medications (58%) or inhalation therapy (39%) (Vanwesemael a, Hellemans, & Dilles, 2014; Vanwesemael b, Hellemans, & Dilles, 2014). A recent study on the medication systems and processes used within the English National Health Service (NHS) described a presence of self-administration of medication policy in 93% of the hospitals (n= 100) (McLeod, Ahmed, Barber, & Franklin, 2014).

Considering the potential benefits of self-administration of medication, the aim of this study was to describe the prevalence of self-administration of medication during hospitalisation in Flanders and the relationship with patient-related and organisational factors.

Methods

Design

A cross-sectional observational study was conducted in 12 hospitals in Flanders, Belgium from February 2015 until June 2015. For each included patient, a questionnaire was completed in an interview with the head nurse. Data were registered on the prevalence of self-administration and demographic characteristics of each patient, and organisational characteristics of the included wards.

Participants

A convenience sample of three university hospitals, seven general hospitals and two psychiatric hospitals participated in the study. The following wards were excluded: paediatrics, emergency departments, operating theatres, intensive care units and day hospitals. A total of 65 wards were contacted. Eight refused participation for time constraints, resulting in a sample of 57 wards. All patients of the participating wards were included.

Data collection

For each included patient, a self-administration of medication questionnaire was completed in an interview with the head nurse. Furthermore, the head nurse completed a questionnaire to describe ward characteristics and self-management policy. Interviewing the head nurse (or representative) to provide data on all patients was chosen in order to be able to include all patients, independent of physical or mental status, and for practical reasons. Nurses consulted the patients' files and, if needed, other health care professionals to complete the questionnaires.

At the level of the ward, data were collected on the type of ward, number of (occupied) beds, procedures for self-administration of medication, intake of home medication, and the storage of medication in the patient room.

At the level of the patient, patient and self-administration of medication characteristics were collected using a questionnaire per patient. Questions concerning patient characteristics included; gender, age, source of admission, discharge destination, care dependency, and health status. Both care dependency and health status had to be indicated on a four point Likert scale. Data collected on medication characteristics concerned; the number of medications taken at home, the number of medications taken during hospitalisation and the number and type of changes in the medication schedule used at home compared to the medication used during hospitalisation. In the last part of the questionnaire, we questioned whether self-administration of medication was considered, who was involved in this decision making process, and whether the nurse thought that the patient would have been able to self-administer medication during the hospitalisation. Also, the current medication management of the patient (self-administration or administration of medication by nurses) was questioned. If the patient did self-administer medication, the name and route of administration of self-administered medication were registered. Afterwards, they were coded using the Anatomical-

Therapeutic-Chemical classification on the fourth level (WHO, 2014). Finally, the reasons why patients were considered able or not able to self-administer were questioned.

Instrument development

The questionnaires were developed through literature review, pilot testing and expert validation. Firstly, questionnaire items were developed based on a review of literature on self-administration of medication and influencing factors. Afterwards, the instrument was pilot-tested for comprehensibility and item selection in a small scaled study on the prevalence of self-administration of medication in a regional hospital (n= 81) (Vanwesemael a et al., 2014; Vanwesemael b et al., 2014). As a result of this pilot-test, five questions on demographic characteristics of the patient, two question concerning medication characteristics, and three question on self-administered medications were added. Afterwards, the adapted questionnaires were presented to a panel of practicing nurses, a physician, and a hospital pharmacist, with different types of specializations and different professional backgrounds. This resulted in minor alterations in some answer categories.

Data analysis

The Statistical Package for Social Sciences (SPSS) version 23.0 (SPSS Inc, Chicago, IL, USA) was used to analyse the data. Kolmogorov-Smirnov and Shapiro-Wilk tests showed non-normality of the distributions of age, number of different medications taken at home, number of different medications taken during hospitalisation and the number of self-administered medications during hospitalisation. Non-parametric statistics were used to analyse these data. Discontinuous data were described using frequency distributions. Continuous data were described using a mean value and standard deviation if normally distributed, or using a median and range if non-normally distributed. The differences between patients with or without self-administration of medication were calculated using non-parametric statistics (Mann-Whitney for continuous and chi-square tests for discontinuous

variables). To explore the relationship between patient-related characteristics and self-administration of medication, stepwise multiple logistic regression was applied. As we wanted to distinguish between patients who were allowed to self-administer a substantial part of their medication and those who were not allowed to (or only occasionally a limited number), we decided to use a cut-off of 50% self-administered medications in the multivariate analysis. Patients had to self-administer at least 50% of their medications in order to be included in the self-administering group of the logistic regression analysis. A p-value ≤ 0.05 was considered as statistically significant.

Ethical considerations

Before the start of the study an approval was obtained from an ethics committee (reference B670201523494). For each participating ward an informed consent was provided to the head nurse. Patient data were collected by interviewing nurses. There was no direct patient contact and all collected data were coded (no identification data of patients). Patients received an information letter about the study and could refuse participation.

Results

Population

Of the 57 participating wards, 23 were based in a university hospital, 29 in a general hospital and 5 in a psychiatric hospital. One questionnaire at the level of the ward was not completed and was therefore excluded from analysis. Most of the wards were medical, surgical, rehabilitation or geriatric wards. As shown in Table 1, the wards had a mean of 29 available and 24 occupied beds.

At inclusion, 1269 patients were hospitalised at the participating wards; none refused participation. The mean age was 64 years old and 51.2% was female. The majority of the patients were living at home before hospitalisation (76.1%) and after discharge the majority

(69.1%) returned back home. The largest group was functionally independent or mildly dependent (63.9%), with a good or rather good health status (64.2%) (see Table 2).

Additional analysis (Appendix A) showed differences based on gender. Men were on average younger (men: 63 years old compared to women: 66 years, $p = 0.002$), were less likely to go home (men: 66.8% compared to women: 71.3%, $p < 0.001$), they had higher care dependency levels (men: 22.0% compared to women: 15.0%, $p = 0.013$) and they had a lower general health status (rather bad health status; men: 32.0% compared to women: 24.7% and bad health status; men: 9.6% compared to women: 5.6%, $p < 0.001$).

Hospitalised patients took on average 6 different medications at home and 9 at the hospital. In 75.0% of the hospitalised patients, the transition from home to the hospital resulted in one or more changes in the medication schedule. The most frequent change was a new prescription in 84.5% of the patients, followed by an alteration in the brand name in 75.0% of the patients. Additional analysis of these results showed differences between the average amount of 6 medications taken by men and 7 by women ($p = 0.002$). Furthermore, a correlation between the age and the amount of medications taken before hospitalisation and during hospitalisation, respectively $r = 0.276$ and $r = 0.232$ was found ($p < 0.001$).

Table 3 and 4 show details on the medication management characteristics at both ward and patient level. Out of 56 wards, 10 wards (17.9%) had a procedure for self-administration of medication during hospitalisation; only four wards (7.1%) had a screening tool to assess the patients' competences to self-administer their medication during hospitalisation. On 37 wards (74%), some patients used medication brought from home during hospitalisation. In half of the included wards (55.4%), less than 20% of their patients stored their medication in their own room. These medication was most frequently stored in the patients' cabinet (64.3%), inside the regular medication package (62.5%) and inside a medication tray belonging to the patient (44.6%).

Prevalence of self-administration of medication

Self-administration of medication was considered in 25.0% of the hospitalised patients (n=300). The decision making process of allowing self-administration of medication was a generally shared decision making process. In 28.3% of cases the decision making process was shared between the treating physician, the nurse, and the patient; in 26.3% of cases between the nurse and the patient; in 14% of cases between the treating physician and the patient; in 9% of cases it was a shared decision between the nurse, treating physician, patient, and the patients' family; and in 6% of cases the decision was made by the treating physician and the nurse. Hospital pharmacists were only involved in 0.1% out of 300 decisions. The general practitioners, providing the general medical treatment for the patient at home, were not involved.

Out of 1269 patients, 278 (22%) self-administered at least one medicine during hospitalisation, with a maximum of 16 different self-administered medications and an average of 4 medications. On average patients took 13.1% of their total amount of medications in self-administration (ratio self-administered medications/number of medications taken during hospitalisation). Moreover, 13.8% of the patients self-administered at least 50% of the total amount of prescribed medication, 5.8% of these patients self-administered 100% of the total amount of prescribed medication. The majority of self-administered medications concerned oral medications (83.5%) and inhalation therapy (7.7%). The most frequently self-administered medications were grouped by the nervous system (23.3%), the cardiovascular system (21.7%) and the alimentary tract and metabolism (16.8%).

The head nurses were asked to judge the ability of every patient to self-administer medication. They estimated that 40.9% of the patients would be able to fully self-administer (prepare and take medication independently during hospitalisation) their medication, 20.8% would be able to only self-administer their medication if their medications were prepared by the nurses at the

ward, and 38.3% would still be fully dependent on the nursing staff for their medication management during hospitalisation.

Reasons for prohibiting or allowing self-administration of medication

Nurses indicated multiple reasons for prohibiting or allowing self-administration of medication for each patient.

Reasons for prohibiting self-administration of medication were; procedures not allowing self-administration (56.3%), the health status of the patient (31.4%), and the caregiver's opinion on self-administration of medication (24.2%). Factors for allowing patients to self-administer their medication were; the patients' mental status (84.8%), the patients' motor skills (82.2%), the patients' ability to express themselves (82.2%), the patient did already self-administer medication at home (82.2%), and the patients' ability to ask for advice concerning their medication (80.8%) (see Appendix B).

Self-administration of medication was not considered in 78.1% of those patients who did not self-administer medication (n= 967).

Organisational characteristics and patient-related characteristics associated with self-administration of medication

In order to evaluate whether organisational characteristics influenced the prevalence of self-administration, the percentage of self-administering patients on different types of wards and wards with and without a procedure were compared. This comparison showed a difference between surgical short-stay wards (81.2%), psychiatric wards (32.1%), surgical wards (22.1%), medical wards (16.9%), rehabilitation wards (9.7%) and geriatric wards (5.6%) ($p = 0.037$). The presence of a procedure for self-administration of medication did not influence the percentage of patients self-administering medication.

To evaluate whether patient-related characteristics were associated with self-administration of medication, patients who did at least self-administer 50% of their total amount of medications

were considered as self-administering patients. As shown in table 5, self-administration was related to gender, care dependency level, general health status, place of stay before admission and after discharge, and age. Patients who were self-administering their medication during hospitalisation were more frequently female (16.7% women vs 10.8% men, $p = 0.003$) and on average younger (self-administering patients: 52.7 years old vs non self-administering patients: 66.4 years old, $p < 0.001$). A lower level of care dependency and a better general health status corresponded with patients self-administering medication more often (respectively 20.3% and 20.3% compared to 2.4% and 2.5%, $p < 0.001$). Patients living at home before hospitalisation self-administered their medication more often (16.0%) compared to patients with other admission sources (7.3%, $p < 0.001$). Also, patients returning home after hospitalisation self-administered their medication more often (17.5%) compared to patients with other discharge destinations (5.4%, $p < 0.001$).

Besides patient characteristics, changes in medication use were related to self-administration of medication. Changes in the home medication schedule negatively influenced the prevalence of self-administration (23.7% if medication schedule was not changed, compared to 10.9% if medication schedule was changed, $p < 0.001$). Patients self-administering medication took a lower amount of different medications during their hospitalisation and before admission, compared to the not self-administering group (respectively 6.5 at the hospital and 5.5 at home, compared to 9.9 at the hospital and 6.6 at home, $p < 0.001$ and $p = 0.005$).

The multivariate analysis of the abovementioned variables (Table 5) resulted in a model explaining 30.3% of the variance ($p < 0.001$). In this model, being a women resulted in 55% more chance to self-administer (1.55 [1.03-2.31]). Also, self-administration of medication was associated with lower care dependency levels, and a better general health status (respectively $RR = 3.42$ [1.71-6.84] and $RR = 3.70$ [1.85-7.39]). If changes were made in the patients'

home medication schedule, this resulted in a decrease of 51% to self-administration of medication during hospitalisation (0.49 [0.32-0.73]). For each year of age increased, the odds of self-administering medication decreased with 3.0% (0.97 [0.96-0.98]). Each extra medicine taken during hospitalisation, resulted in 17.0% less self-administration of medication (0.83 [0.77-0.89]). Compared to the medication taken at home, each extra medicine taken at home before hospitalisation resulted in 16.0% increase of self-administration medications (1.16 [1.08-1.25]).

Discussion

In Flemish hospitals, 22% of the patients self-administer at least one medicine. Nurses judged 40.9% of the hospitalised patients would be able to fully self-administer (prepare and take medication independently during hospitalisation) their medication. These findings show that far more patients would have been able to self-administer their medication during hospitalisation.

The study sample was representative for patients hospitalised in Flemish hospitals, as all patients of 57 participating wards were included. The sample was obtained by interviewing head nurses. Interviewing the head nurse (or representative) provided data on all patients, in order to be able to include all patients, independent of physical or mental status, and for practical reasons.

Self-administering patients were on average younger, female, with a lower number of different medications per day before hospitalisation and during their hospital stay. More often, they came from their own home environment and returned back there after discharge. Self-administering patients had a better general health status, and had lower care dependency levels. Other research involving a population of patients who did not self-administer medication during hospitalisation, showed that patients under 60 years old had a significant greater desire to self-administer their medication in hospital, compared to patients over 60

years old (Deeks & Byatt, 2000). Combined with the rationale to prohibit or allow self-administration of medication these results describe the type of patient who could possibly self-administer medication. These results should be used in further research on developing a screening tool to assess the patients' competences to self-administer medication.

Although, self-administration of medication was allowed and decisions concerning this topic were made, only 17.9% of the wards had a procedure for self-administration and only 7.1% of the wards had a screening tool to assess the patients' competences to self-administer their medication during hospitalisation. These data confirm the need for a uniform protocol and a uniform screening tool to assess the patients' appropriateness to self-administer their medication. The differences in the progress of implementing self-administration in hospitals was also reported in an audit performed by the National Health Service (NHS), which provides healthcare for all United Kingdom citizens, in different NHS Trusts (Audit Commission, 2001). A clear policy and protocols on self-administration are required in case of hospital accreditation. For example, the Joint Commission International (JCI) has set a standard on Medication Management and Use (MMU), or to be precise 'Standard MMU.6.2 policies and procedures govern medications brought into the hospital for patient self-management or as samples'. Moreover, JCI allows self-management if this is governed by policies and procedures (Joint Commission International, 2013).

A 'self-administration of medication for inpatients' policy is necessary. This policy should consist of a procedure on self-administration of medication during hospitalisation; an assessment to decide whether patients are appropriate to self-administer medication; an observation tool to monitor medication adherence while self-administering medication; support for both patients who need to self-administer medication, and caregivers who support patients while self-administering (e.g. patient education). In an attempt to provide a facilitating context for self-administration of medication, a clear social and legal context

should be provided, e.g. responsibility in case of errors and delivery of medication. Legal concerns on self-administration of medication should be addressed in order to prevent the promotion of self-administration of medication to be problematic. A shared decision on allowing or prohibiting self-administration of medication has to be made. This decision has to be made in consultation between physicians, nurses and patients, but also with the hospital pharmacist. Hence, the provision of medication remains the responsibility of the hospital pharmacists in an active cooperation with the nurses – who administer medication – (K.B., 1991). The involvement of hospital pharmacists during this study was practically non-existent. Self-administration of medication requires an integrated multidisciplinary approach, to ensure that patients maximize the benefits from their medication.

Another important factor in providing a facilitating context for self-administration concerns the approach of possible barriers for implementation. In example, possibly adapting the current medication management system, considering what schedule of drugs can be allowed, how and where to safely store self-administered medication, etc. Because of the significant impact of self-administration of medication on healthcare, the term self-‘administration’ might not be wide enough. Therefore, we suggest the term ‘self-management of medication’, which includes a broader range of aspects; protocol, screening tool, observation tool, multidisciplinary approach, the social and legal context. Furthermore, self-management of medication does not only demands the patient to administer medication, but demands more patient engagement.

Self-management of medication will affect the daily nursing practice. Rather than preparing and administering medication, nurses will be providing a more person-centred care, thereby allowing more self-management of patients during hospitalisation. The activity of preparing and administering medication will be partly replaced by the assessment of patients’ competence or appropriateness concerning self-management of medication, supporting and

providing education concerning medication and evaluating the possibility of self-management of medication during the entire hospital stay.

Conclusion

During this study, 22% of the hospitalized patients self-administered at least one medicine during hospitalization. Although self-administration of medication was allowed, only 17.9% of the wards had a procedure for self-administration of medication during hospitalisation and 7.1% of the wards had a screening tool to assess the patients' competence to self-administer medication. Self-administering patients were on average younger, female, having a lower number of different medications per day before and during hospitalisation. These patients had a good health status, and were independent to mildly dependent on nurses on the ward.

Clinical resources

Belgian Centre for Pharmacotherapeutic Information: <http://www.bcfi.be/>

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