



SelfMED

Patient self-management
of medication in hospital

Thesis submitted for the degree of Doctor in Medical Sciences at the University of Antwerp to be defended by
Toke VANWESEMAEL

Antwerp, 2018

Supervisors

Prof. Dr. Tinne Dilles

Prof. Dr. Koen Boussery

University of Antwerp
Faculty of Medicine and Health Sciences
Department of Nursing and Midwifery Sciences





Universiteit Antwerpen
Faculteit Geneeskunde en Gezondheidswetenschappen
Master Verpleeg- en Vroedkunde

SelfMED

Self-management van geneesmiddelen door gehospitaliseerde patiënten

Proefschrift voorgelegd tot het behalen van de graad van Doctor in de Medische Wetenschappen aan de Universiteit Antwerpen te verdedigen door Toke VANWESEMAEL

Antwerpen, 2018

Promotoren
Prof. Dr. Tinne Dilles
Prof. Dr. Koen Boussery

Members of the jury

Prof. Dr. Guido R.Y. De Meyer

Department of Pharmaceutical Sciences, University of Antwerp

Prof. Dr. Veronique Verhoeven

Department of General Practice, University of Antwerp

Prof. Dr. Lisette Schoonhoven

University Medical Center Utrecht

Prof. Dr. Katja Taxis

Department of Pharmacy Section of Pharmacotherapy and Pharmaceutical Care, University of Groningen

Supervisors

Prof. Dr. Tinne Dilles

Department of Nursing and Midwifery Science, NuPhaC, University of Antwerp
Department of Healthcare - Lier, Thomas More University College

Prof. Dr. apr. Koen Boussery

Pharmaceutical Care Unit, Ghent University

Support

This study was partially financed by the Thomas More University College, under supervision of Prof. Dr. Tinne Dilles

© Toke Vanwesemael
2018 *All rights reserved*



ISBN 978-90-5728-610-0

Depotnummer D/2018/12.293/35

Printing Ridderprint BV, www.ridderprint.nl.

Digital version online available at www.nuphac.eu or QR code

Artwork Marc Janssens, www.marcjanssens.be, atelier36@marcjanssens.be

General table of contents

Chapter 1	
General introduction	5
Chapter 2	
Legal aspects of self-management of medication in Belgian hospitals	27
Chapter 3	
SelfMED: Self-administration of medication in hospital: a prevalence study in Flanders, Belgium	33
Chapter 4	
Self-management of medication during hospitalisation: Healthcare providers' and patients' perspectives	47
Chapter 5	
The willingness and attitude of patients towards self-administration of medication in hospital	73
Chapter 6	
The attitude and opinion of healthcare providers on self-administration of medication by hospitalized patients	93
Chapter 7	
An evidence-based procedure for self-management of medication in hospital: development and validation of the SelfMED procedure	111
Chapter 8	
The SelfMED procedure – self-management of medication on a cardiology ward: administration errors, registration errors and feasibility	127
Chapter 9	
Discussion	143
Summary – Samenvatting	153
Appendices	160
List of abbreviations	178
List of figures and tables	180
Curriculum Vitae	184

A detailed table of content is provided at the start of each chapter



Chapter 1

General introduction

Outline

1	General introduction	7
1.1	Background	7
1.1.1	Health: definitions and concepts	7
1.1.2	Health in relation to Dororthea Orem's General Theory of Nursing	7
1.1.3	Self-management as an aspect of self-care	9
1.1.4	Medication self-management as an aspect of self-management	10
1.1.5	The impact of medication self-management	11
1.1.6	Consequences of self-management deficits and non-adherence	13
1.2	Self-management of medication in hospital	14
1.2.1	Prevalence of self-administration of medication in hospital	16
1.2.2	Interventions and tools for self-administration of medication in hospital	16
1.2.3	Evidence on the consequences of self-administration of medication in hospital	18
1.3	Problem statement	20
1.4	Research aims	21
1.5	Outline of the thesis	21
1.6	References	23

1 General introduction

This chapter has been submitted to the Nursing Science Quarterly:

Vanwesemael, T.; Boussery, K.; Dilles, T. Patient self-administration of medication in hospital: current state of the art of an intervention in line with the fundamental principles of the nursing profession.

This general introduction provides the knowledge foundations on which the SelfMED project is built. The first section provides more information on important underlying concepts and theories on health, self-care and self-management. In addition, the concept of medication self-management is discussed. The second part focuses on the current state of the art on self-management of medication in hospital and a concise review of the current literature including self-management of medication in Belgian hospitals. The general introduction concludes with the problem statement, research aims, and the outline of the thesis.

1.1 Background

1.1.1 Health: definitions and concepts

The World Health Organization (WHO) formulated a definition of health in 1948, describing health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (WHO, 1948). This definition has not been amended since 1948 (WHO, 1948). In 2011 during a Dutch conference, Huber et al. proposed a new definition on health. This proposal was based on the various critiques on the WHO definition, stating the absoluteness of the word ‘complete’ in relation to a person’s wellbeing, changes in the nature of disease in current times, e.g. a worldwide increase of chronic diseases, and the difficulty to objectify and measure ‘complete’ physical, mental and social well-being. The new definition of health was described as “the ability to adapt and self-manage in the face of social, physical, and emotional changes” (Huber et al., 2011).

1.1.2 Health in relation to Dororthea Orem’s General Theory of Nursing

The dynamic description of managing various types of changes in life in order to maintain health, as described by Huber et al. can also be found in the Orem’s General Theory of Nursing (Orem, 2001).

A first aspect of the Orem’s Self-Care model is the Self-Care Theory (see Figure 1). This theory describes how and why people care for themselves, and focusses on the “self”, or the “I”. The Self-Care Theory includes all activities individuals perform or initiate on their own behalf in maintaining life, health and well-being. If necessary individuals perform self-care activities in line with their personal abilities in order to maintain life, health and well-being. Yet, these abilities could be influenced by their age, gender, stage of development, life experience, socio-cultural factors, living patterns, healthcare or family system, available resources and their health. Self-care activities can compose to universal needs that are common to all individuals, to needs resulting from maturation or due to a condition or event, or they can result from illnesses, injuries, diseases or its treatments. A set of self-care actions will be performed during a certain amount of time in order to meet self-care requisites with the use of methods, sets of operations and actions. This is also referred to as the therapeutic self-care demand (Meleis, 2012; Orem, 2001).

When a demand to care for oneself is greater than the individual’s ability to meet this demand, a self-care deficit is present. As stated in the Orem’s Self-Care Deficit Theory, nursing aid can be required to provide self-care. Therefore, this theory focusses on the “you and me”. Depending on the need of the person, several methods of assistance can be provided. These five methods concern; (1) acting for and

doing for others, (2) guiding others, (3) supporting one another, (4) teaching one another, (5) providing an environment to promote the patient's ability to meet current or future demands.

Actions undertaken in order to deal with a self-care deficit could be described with the use of the Theory of Nursing Systems, which focusses on "we". Concerning Orem's approach, the nursing process evaluates and determines self-care deficits and defines both the role of the nurse and the patient in order to meet self-care demands. This nursing process consists of three steps. First, an assessment will be provided to determine the problem or deficit. During the second step, a nursing diagnosis will be provided, as well as a nursing care plan for delivering care. Three types of nursing systems can be proposed in order to fulfill the patient's self-care needs; (1) wholly compensatory system, (2) partially compensatory system or (3) supportive educative system. The wholly compensatory system could be represented by a situation in which the patient is unable to fulfill a self-care need. The partially compensatory system could be represented by a patient who can meet some self-care requisites to a certain degree yet in need of a nurse for ultimately performing self-care. The supportive educative system could be used when a patient can meet self-care yet needs assistance with e.g. knowledge acquisition skills. During the third step, the care will be implemented or applied and afterwards evaluated (Meleis, 2012; Orem, 2001).

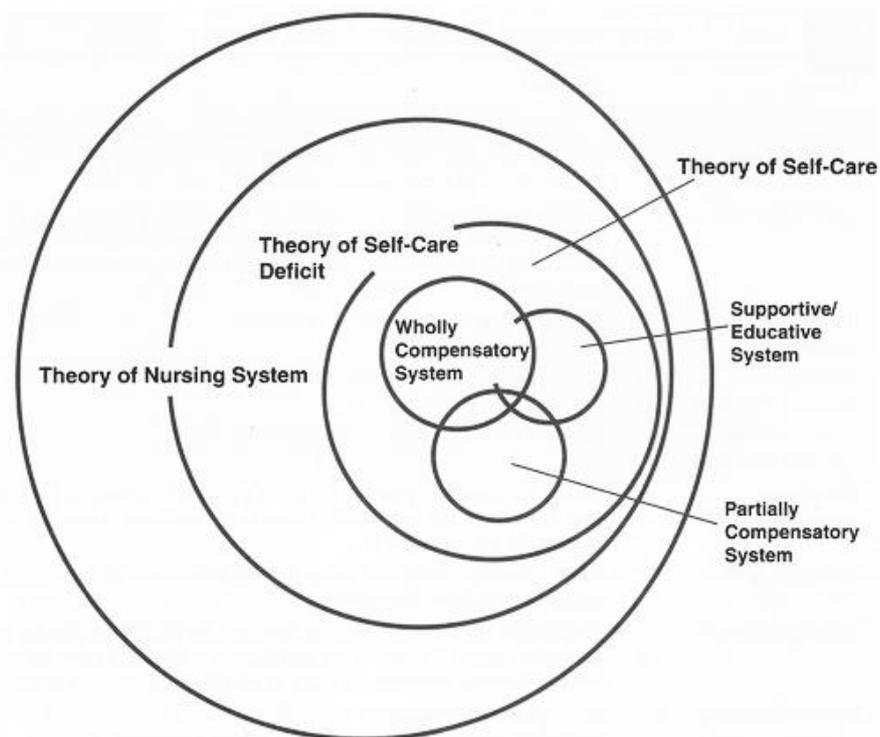


Figure 1. Orem's General Theory of Nursing (Orem, 1995; Orem, 2001)

1.1.3 Self-management as an aspect of self-care

As stated in the abovementioned definition of health by Huber et al., the Orem's Self-Care Deficit Theory and Orem's General Theory of Nursing, self-care and self-management are key aspects of maintaining health. Literature research on the meaning of these concepts identified an article who provided a thorough description of both concepts with the use of a concept delineation process.

Self-care was defined as "The ability to care for oneself and the performance of activities necessary to achieve, maintain, or promote optimal health (including activities specific to acute and chronic health conditions)" (Richard & Shea, 2011). Self-care was described as a wide range of health and human development applications. The aspect 'self' does not only refer to an individual, it also includes broader social support systems. Furthermore, it did not only focus on an illness or disease but also on prevention and other applications beyond this.

Self-management was defined as "The ability of the individual, in conjunction with family, community, and healthcare professionals, to manage symptoms, treatments, lifestyle changes, and psychosocial, cultural, and spiritual consequences of health conditions (particularly chronic diseases)" (Richard & Shea, 2011). It was observed, the term self-management was mostly related to chronic disease. It included actions such as managing treatments and medications, safety, symptoms and other implications of chronic diseases. The concept delineation method also revealed the use of self-management programs, who provide interventions for facilitating patients' abilities to self-monitor and being an active partner in their health management process. In conclusion, a conceptual model provided information on the relationship between self-care and self-management (see Figure 2). It is possible to state self-care is a broad concept, as of which self-management is a part (Richard & Shea, 2011).

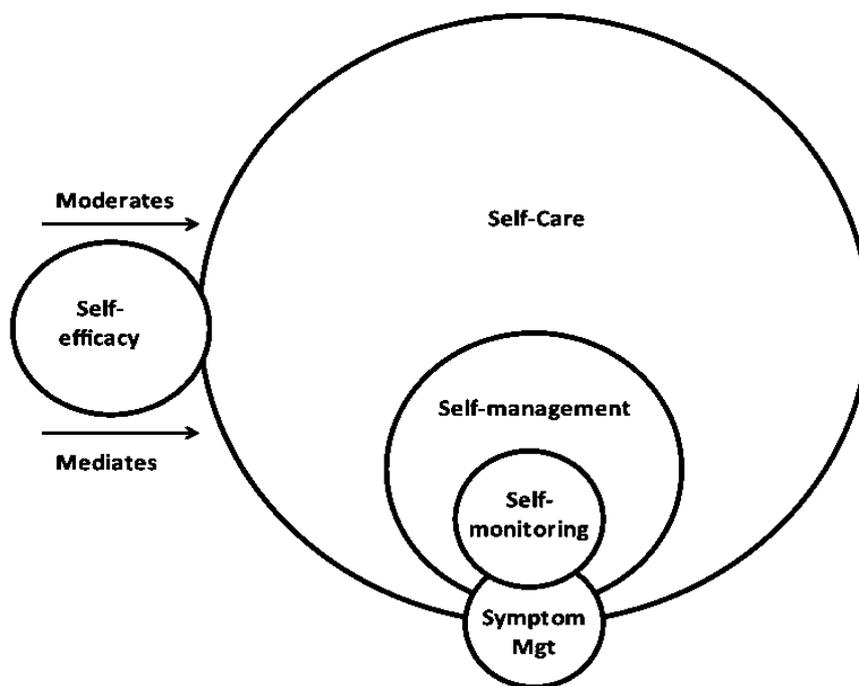


Figure 2. Conceptual model of the relationships between self-care, self-management, self-monitoring, symptom management and self-efficacy (Richard & Shea, 2011)

The evolution towards self-care and self-management in healthcare resulted in patients being more actively involved in their own health. During the 20th century, movements towards more self-care were observed (McCormack, 2003). This movement continued, resulting in several social movements, social reform and self-help movements (Castro, Van Regenmortel, Vanhaecht, Sermeus, & Van Hecke, 2016; McCormack, 2003; Wilkinson & Whitehead, 2009). This shift towards individuals being more involved and taking responsibility for their health led to policy changes, who paved the way to the involvement of patients in the healthcare process. For example, the Canadian Minister of Health Jake Epp identified self-care as one of the three mechanisms to address health challenges in 1986. It was placed in a central position within a national framework for health promotion. Also, the burden of increasing chronic diseases and increasing numbers of older citizens motivated participation in self-care and resulted in more focus on self-management programs (McCormack, 2003; Wilkinson & Whitehead, 2009). In line with this shift from a passive towards a more actively involved patient, healthcare providers shifted from a paternalistic approach which was associated with compliance towards a more empowering and egalitarian approach (Barlow, Wright, Sheasby, Turner, & Hainsworth, 2002; London Audit Commission, 2001; McCormack, 2003; Trappenburg et al., 2013; Wilkinson & Whitehead, 2009).

Jo Vandeurzen, Belgian Minister of the Flemish Division of Wellbeing, Public Health and Family, also noted this shift. As stated in his position paper published in 2014 and opinion paper published in 2010 he stresses out the importance of a self-reliant citizen and the need for patient-centered care. Both papers acknowledged citizens expect more self-determination (Vandeurzen, 2010, 2014). Maggie De Block, Belgian Minister for Social Affairs and Public Health, described the increased use of eHealth influencing patient empowerment in her position paper in 2014 (De Block, 2014). Up to date, this resulted in a website for all Belgian citizens, which provides health records within a personal health viewer. The aim of this website is to allow individuals to be actively involved in their care, being able to make an informed decision about their care, and engage in a dialogue with healthcare providers. Both Flemish, French and German patient associations were involved in the process of developing this eHealth project (Federal Public Service for Public Health, 2018).

1.1.4 Medication self-management as an aspect of self-management

Patients are increasingly involved in healthcare, as self-management – a part of self-care – is encouraged within healthcare systems. The aspect of medication self-management is considered a very important aspect, given that pharmacotherapy plays an essential role in the treatment of various illnesses. For this reason, patients should be able to correctly self-manage their medication (Richard & Shea, 2011). Therefore, healthcare professionals' focus on medication self-management is needed.

Self-management of medication has been previously defined as “the extent to which a patient takes medication as prescribed, including not only the correct dose, frequency and spacing, but also its continued, safe use over time.” (Bailey, Oramasionwu, & Wolf, 2013). This definition includes not only the act of administering medication, but also takes into account that patients' need to fulfill a set of actions in order to manage their medicines in ambulatory care. As shown in Figure 3, the process of self-management of medication has been translated into a model by Bailey et al. It starts with a prescription, which has to be filled and picked up. During the second step patients obtain their medicines and should learn how to use them correctly (e.g. know the name of the medicine, the administration route, the administration time, etc.). The third step includes organizing their medication intake and planning their daily medicines schedule. Actually taking the prescribed medication was described in the fourth step of the model. During step five, patients monitor their medication intake and evaluate in example possible side effects or symptoms related to their medicines in order to undertake any action if needed. The last step concerns the act of sustaining a correct medication intake routine in a safe and appropriate way (Bailey et al., 2015; Bailey et al., 2013).

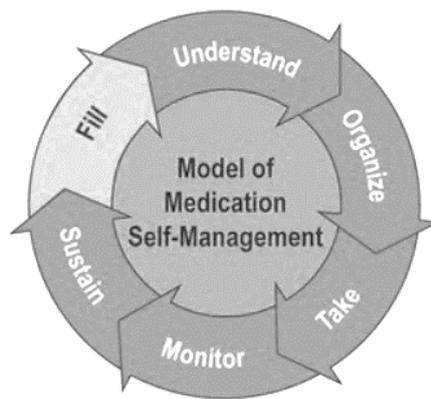


Figure 3. The medication self-management model (Bailey et al., 2013)

1.1.5 The impact of medication self-management

Medication self-management requires patients to complete a set of actions, as can be derived from the medication self-management model. Literature on these aspects showed individuals struggle in various ways during this process, influencing medication adherence.

When patients fail to fill the prescription, this has been described in literature as ‘primary non-adherence’. Literature search indicated 22.8 % of community-based patients living in Portugal did not fill all their prescriptions (da Costa et al., 2015). These findings were in line of 29.5 % American women aged over 55 years old who did not pick up their bisphosphonate prescription within 60 days (Tamblyn, Egualé, Huang, Winslade, & Doran, 2014). A Canadian study on filling newly prescribed drugs in a population aged over 66 years old showed 24.0% of the included population did not fill all their prescriptions within 30 days after hospital discharge (Fallis, Dhalla, Klemensberg, & Bell, 2013).

After correctly filling and picking up medicines, patients should have knowledge and understanding on their medicines. Yet, understanding prescription labeling and written information sources remains difficult. In order to overcome this hurdle, Mullen et al. provided a recent systematic review on best practices for the prescription medication information (Mullen et al., 2018). During a Spanish study, 7278 individuals attending their pharmacy were questioned on their medication knowledge; only 28% had an adequate knowledge of the medication taken. Medication knowledge in this study was evaluated with the use of four dimensions: medication use process (dosage, frequency, duration of treatment and administration route), therapeutic objectives (indication and therapeutic outcome), medication safety issues (precautions, warnings, side effects, contraindications, interactions). Participants scored lowest on the dimension of medication safety issues (Romero-Sanchez, Garcia-Cardenas, Abaurre, Martinez-Martinez, & Garcia-Delgado, 2016).

Throughout organizing how and when to take medicines within daily routines, problems have been described. A meta analyses on the impact of dosing frequency on adherence in patients with chronic cardiovascular diseases indicated a once-daily administration was associated with a 56.0% reduction on the risk of non-adherence compared to two or more daily administrations (RR: 0.44 0.35-0.54) (Caldeira, Vaz-Carneiro, & Costa, 2014). A systematic review by Conn et al on medication adherence intervention studies highlighted the positive effect of creating a link between medication administration and daily routines. This specific intervention was effective in increasing medication adherence (Conn, Ruppap, Enriquez, & Cooper, 2016). Also, the guidelines for the management of arterial hypertension of the European Society of Hypertension indicated single-pill fixed-dose combinations reduce pill burden and simplify treatment regimens (Mancia et al., 2013).

In the next stage, patients will actually administer medication. Performing this act of medication administration and hereby adhering to the therapy has been defined by the WHO as: “the extent to which a person’s behavior – taking medication, following a diet, and or executing lifestyle changes – corresponds with the agreed recommendations from a provider.” (Sabate, 2003). The WHO report “Adherence To Long-term Therapies: Evidence For Actions” stated only 50% of patients suffering chronic diseases adhered their medication therapies. Adherence rates were even lower in developing countries, ranging from 26%, to 27% and 43% adherence in respectively the Seychelles, Gambia and China (Sabate, 2003). More recent estimated rates of non-adherence to medication in Middle Eastern countries ranged from 1.4% to 88%, and an average of 57% in a large meta-analysis in cardiovascular diseases (Al-Qasem, Smith, & Clifford, 2011; Naderi, Bestwick, & Wald, 2012).

From the perspective of adherence, the WHO report provided an overview of five determinants that could affect adherence rates (see Table 1). All of these determinants do not directly interfere with not succeeding in actually administering medication (step ‘Take’ within the medication self-management model). For example, social and economic factors can already interfere the patient’s ability to buy their medicines. Also, factors related to the patient or the patient’s condition can result in not sustaining the prescribed medicines therapy. Therapy related conditions such as a complex regimen might interfere the ability of correctly managing and organizing medication intake (Caldeira et al., 2014; Sabate, 2003).

- Social and economic factors:
 - Socioeconomic variables
 - Cost of treatment
- Health system and healthcare team factors:
 - Characteristics of the health care provision
 - Patient and prescriber interaction
 - Prescribers follow-up
 - Multiple providers
- Condition related factors:
 - Characteristics of disease
 - Severity of the disease
 - Chronic or acute disease
- Patient related factors:
 - Patients own view of required therapy
 - Cognitive functioning
 - Health literacy
 - Motivation for self-care
 - Social support
- Therapy related:
 - Multiple medications
 - Complexity of therapy
 - Adverse drug reactions
 - Duration of therapy

Table 1. The five dimensions of adherence (Sabate, 2003)

When patients correctly adhere their medication, the act of monitoring comprises a patient possesses knowledge on potential side effects, risks, and warnings. The WHO described patient’s health literacy influences this competence of monitoring and acting correctly upon symptoms or signs related to medication intake (Sabate, 2003). Also, research by Romero-Sanchez et al indicated the knowledge of individuals concerning side effects, warnings, contraindications and interactions were inadequate (Romero-Sanchez et al., 2016).

The last step of the model of medication self-management concerns sustaining a correct medication intake routine in a safe and appropriate way (Bailey et al., 2013). This final step was described in literature as 'persistence', which was defined as "the length of time between initiation and the last dose, which immediately precedes discontinuation." (Vrijens, Antoniou, Burnier, de la Sierra, & Volpe, 2017; Vrijens et al., 2012). A recent systematic review on the persistence rates in rheumatoid arthritis, psoriasis and psoriatic arthritis patients indicated persistence rates were low. Factors such as younger age, female gender, high medication related costs, greater disease severity and increased comorbidities were associated with lower persistence rates (Murage et al., 2018). In addition, a retrospective study evaluated the persistence in six medication classes (prostaglandin analogs, statins, bisphosphonates, oral antidiabetics, angiotensin II receptor blockers, and overactive bladder medications). Overall, it was possible to conclude persistence rates differed, mostly prostaglandin analogs and overactive bladder medications (37% - 35%) were not optimal compared to other classes (range 60% - 72%) (Yeaw, Benner, Walt, Sian, & Smith, 2009).

1.1.6 Consequences of self-management deficits and non-adherence

Failing the process of self-management of medication results in non-adherence to pharmacotherapy. Several studies identified the consequences of non-adherence. Cutler et al evaluated the economic impact of non-adherence across 14 different diseases in a systematic review. It was possible to conclude medication non-adherence results in a significant economic burden on healthcare systems. Within these 14 diseases, the economic cost ranged between 949 and 44 190 US\$ per person (Cutler, Fernandez-Llimos, Frommer, Benrimoj, & Garcia-Cardenas, 2018). A systematic by De Vera et al showed nonadherence to statins resulted in an increased risk for cardiovascular diseases (RR ranging from 1.22 to 5.26) and increased mortality (RR ranging from 1.25 to 2.54) (De Vera, Bhole, Burns, & Lacaille, 2014). A systematic review on the clinical impact of non-adherence among COPD patients indicated non-adherence resulted in increased hospitalizations, mortality, decreased quality of life and loss of productivity (van Boven et al., 2014). Research among patients with a primary hospital discharge diagnosis of heart failure showed non-adherence was associated with an increased risk of the individual outcomes of all-cause mortality (HR 2.99, 95% CI 2.09-4.29; $P < .001$), cardiovascular hospitalizations (HR 1.86, 95% CI 1.22-2.83; $P = .004$), and heart failure hospitalizations (HR 1.81, 95% CI 1.26-2.60; $P = .012$) (Fitzgerald et al., 2011). A meta-analysis on the relationship between adherence to drug therapy and mortality, showed that good adherence was associated with lower mortality (OR 0.56, [0.50-0.63]) (Simpson et al., 2006).

Several interventions have been developed in order to improve medication adherence. A review of interventions employed to improve medication adherence comprised following (Costa et al., 2015);

1. behavioral interventions (aiming to modify the patients' behavior towards treatment),
2. educational interventions (patient education),
3. integrated care interventions (such as disease management or care management),
4. self-management interventions (aiming to inform patients and provide them with an active role),
5. risk communication interventions (provide patients with information on risks) and
6. packaging and daily reminders (e.g. phone calls, text messages, pagers,...).

Although this research identified some successes, the authors suggested to focus on long-term adherence rather than short-term. Also, they emphasized the role of formal and informal healthcare providers in supporting patients' adherence and improving health literacy. In conclusion, they suggested new and innovative single-intervention strategies should be developed in order to improve adherence. The focus of new research should be on implementation in clinical practice (Costa et al.,

2015). A recent Cochrane review on interventions for enhancing medication adherence confirmed the wide range of complex interventions, and again highlighted the importance of feasible long-term interventions. Supplementary, the authors stressed out the importance of objective adherence measures and sufficient study power (Nieuwlaat et al., 2014).

Conclusive notes on the underlying concepts and theories on health, self-care and self-management, and the concept of medication self-management.

- ✓ An important aspect of maintaining health is the ability of individuals to adapt and self-manage.
- ✓ Orem's General Theory of Nursing describes individuals taking care for themselves. When a demand to care for oneself is greater than the individual's ability to meet this demand, a self-care deficit is present. With the use of the Theory of Nursing Systems, deficits should be identified and the role of nurses, and in extend the role of healthcare providers, in order to deal with these self-care deficits should be defined.
- ✓ Self-care, as an important topic within Orem's Theory, is a broad concept, as of which self-management, as an important aspect of health, is a part. Self-management can be defined as; "The ability of the individual, in conjunction with family, community, and healthcare professionals, to manage symptoms, treatments, lifestyle changes, and psychosocial, cultural, and spiritual consequences of health conditions (particularly chronic diseases)".
- ✓ During the 20th century, an evolution towards self-care and self-management in healthcare resulted in patients being more actively involved in their own health.
- ✓ The aspect of medication self-management is considered a very important aspect given that pharmacotherapy plays an essential role in the treatment of various illnesses. For this reason, patients should be able to correctly self-manage their medication and focus on medication self-management is appropriate.
- ✓ Medication self-management can be defined as; "the extent to which a patient takes medication as prescribed, including not only the correct dose, frequency and spacing, but also its continued, safe use over time."
- ✓ Literature shows individuals struggle during the process of medication self-management, resulting in an economic burden and a negative impact on several patient related outcomes.

1.2 Self-management of medication in hospital

The importance of self-management in maintaining health was previously described by Huber et al. and confirmed by Orem's General Theory of Nursing (Huber et al., 2011; Meleis, 2012; Orem, 2001). An important aspect of self-management included self-management of medication (Richard & Shea, 2011). Literature on this topic revealed individuals not succeeding in self-management of medication has profound implications.

During hospitalization, it is common nurses take over the patient's medication management. This results in a disruption in the continuity of the patient's medication self-management. When allowing patients to continue their medication self-management, nurses – and other healthcare providers –

should evaluate the patients' individual ability to self-manage during their hospital stay. This approach fits Orem's Grand Theory of Nursing. If - based on the Orem's Self-Care Deficit Theory - patients are not capable of self-managing medication, aid is required. Healthcare providers can support the deficit related to medication self-management, for example by providing nurse administered medication, allow patients to self-manage but yet guide them during the act of self-administration, or teach patients concerning their medicines. Based on the Theory of Nursing Systems, nurses will first assess and evaluate the precise self-care deficits related to medication self-management in hospital. Afterwards, a care plan is provided defining the extent to which a patient should be supported. Therefore, medication self-management in hospital could provide continuity in the medication self-management process of the patient, detect problems related to medication self-management and intervene by for example providing education, and result in better medication self-management competences and therapy adherence.

The concept of self-management of medication in hospital has been described in literature in 1959. The article described self-management of medication in hospital as 'bedside self-medication' and 'self-administered medications'. Bedside self-medication was a part of program for postpartum patients, in which nurses teach mothers on their medicines by showing labels, calling out the name of the medicine and explaining its purpose. Also, these nurses encouraged mothers to take their medicines, just like they would do in their own home (Parnell, 1959). In recent years, the London Audit Commission, the Society of Hospital Pharmacists of Australia (SHPA), the Royal Pharmaceutical Society (RPS) and the United Kingdom Nursing and Midwifery Council encouraged the implementation of self-management of medication in hospital. Again, the term 'self-administration of medication' was used (Davis et al., 2002; London Audit Commission, 2001; Royal Pharmaceutical Society, 2005; UKCC, 2002). As a result of this, several organizations within the English National Health Service (NHS) provided their guideline on self-administration of medication online available. For example; the Peninsula Community Health (Palmer, 2014), South Staffordshire and Shropshire Healthcare (Riley & Mills, 2014) and the Royal Cornwall Hospital (Glenn, 2013).

The concept of self-administration of medication can withhold a diversity of underlying approaches. The SPHA described self-administration of medication aims to evaluate the medication management of hospitalized patients in order to prevent medication related problems after discharge. This approach could identify and address problems as a part of the discharge planning process. It enables assessing potential problems or risks concerning medication management in the future (Davis et al., 2002). Compared to the SPHA, the RPS focused more on self-administration of medication as being a transfer of responsibility, which depends on the patient's ability to manage the involved tasks, as well as giving their consent to self-administer medication in hospital (Royal Pharmaceutical Society, 2005). During our research, self-management of medication in hospital was defined as patients who store, prepare and administer their medication themselves, if they comply with certain criteria. During the process of self-management of medication, patients are monitored and supported by nurses, physicians and hospital pharmacists. If problems occur during the act of medication self-management, these should be identified and addressed in order to prevent medication related problems after discharge. In addition, also patients who are not able to self-manage medication, yet are expected to self-manage after discharge, should be given the opportunity to learn to self-manage their medication whilst in hospital.

1.2.1 Prevalence of self-administration of medication in hospital

Two systematic reviews performed by Wright et al. and Richardson et al. regarding the effects of self-administration of medication in hospital included studies from; Australia, Hong Kong, United States of America, France, United Kingdom, Canada, Ireland and New Zealand (Richardson, Brooks, Bramley, & Coleman, 2014; Wright, Emerson, Stephens, & Lennan, 2006). Nevertheless, actual literature on the prevalence rates of self-administration in hospitals remains scarce. A study commissioned by the NHS in 2001 showed the actual uptake of self-administration of medication was limited in the 183 NHS hospitals included. As shown in Figure 4, policies are in place, yet they are only applied to a limited category of patients (London Audit Commission, 2001). More recent, in 2011 a study on the medication systems and processes used within 100 NHS hospitals indicated, 93% of the hospitals were equipped with a self-administration of medication policy (McLeod, Ahmed, Barber, & Franklin, 2014). Research on the prevalence of self-administration or implementation strategies for self-administration in Belgium is lacking. A pilot study conducted at a Flemish medical and a surgical ward showed that 32.1% of the included patients (n = 81) self-administered at least one medicine during hospitalization. The majority of these were oral medications (58%) or inhalation therapy (39%) (Vanwesemael, Hellemans, & Dilles, 2014).

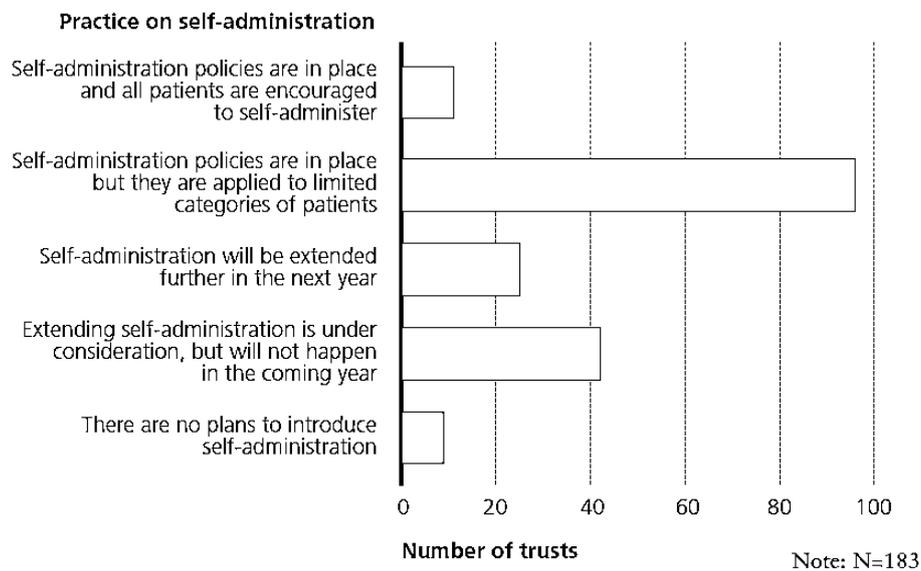


Figure 4. Self-administration of medicines by patients in hospital (London Audit Commission, 2001)

1.2.2 Interventions and tools for self-administration of medication in hospital

In order to facilitate and provide implementation of self-administration of medication in hospital, guidelines, procedures or policies are needed. A pilot study conducted at a Flemish medical and surgical ward identified the absence of a procedure or screening tool for self-administration of medication (Vanwesemael, Hellemans, & Dilles, 2014). As previously described, the majority of NHS hospital are equipped with self-administration of medication guidelines (Glenn, 2013; London Audit Commission, 2001; Palmer, 2014; Riley & Mills, 2014). These guidelines consist of several components, based on the Standards for Medicines Management provided by the Nursing and Midwifery Council (NMC) (Nursing and Midwifery Council, 2010). Yet, after comparing three guidelines online available, it was possible to conclude their content was not similar and sometimes focused differently on some components, as described hereinafter.

Component one; a set of inclusion and exclusion criteria for selecting patients were provided. Comparing the guidelines showed, besides a basic set of similar criteria, criteria varied in content and strictness of application for exclusion between guidelines. *Component two*, an assessment in order to evaluate the patient's capabilities for self-administration had to be taken. The assessments mostly tended to question seven identical questions with the possibility to answer yes/no. Two guidelines added one supplementary other question (Glenn, 2013; Palmer, 2014). Another guideline included a total of 16 questions in their assessment and provided a color code rating on top of the yes/no answer categories. These color codes were being linked to certain actions (Riley & Mills, 2014). If patients were deemed capable, *component three* indicated they should be informed with the use of an information leaflet and sign a consent form. Two guidelines allowed patients to administer their own medicines brought from home – also known as; Patients Own Drugs or PODs -, a check of these medicines before allowing had to be provided (Glenn, 2013; Palmer, 2014). When self-administering medication, patients were allocated to a certain level of self-administration. The NMC defined three levels;

-
- Level 1** “The registrant is responsible for the safe storage of the medicinal products and the supervision of the administration process ensuring the patient understands the medicinal product being administered.”
-
- Level 2** “The registrant is responsible for the safe storage of the medicinal products. At administration time, the patient will ask the registrant to open the cabinet or locker. The patient will then self-administer the medication under the supervision of the registrant.”
-
- Level 3** “The patient accepts full responsibility for the storage and administration of the medicinal products. The registrant checks the patient's suitability and compliance verbally.”

Despite these predefined levels, one guideline described a level four. This level described patients self-administering medication in another environment (during leave), yet being able to return to the hospital pharmacy in order to collect their weekly medicines (Riley & Mills, 2014). All guidelines described agreements and practical arrangements concerning self-administration of medication (e.g. prescribing, storing and dispensing medication). *Component four*; the intake of self-administered medicines should be monitored. Notwithstanding this component, one guideline did not provide any concise chart or list for monitoring self-administration of medication. This could be explained by following statement within the guideline: “The policy does not apply to patients who require close support, training and monitoring in order to take their own medications safely.” (Glenn, 2013). Another guideline provided both a medicines reminder sheet and a self-administration tick chart for patients, and a self-medication compliance checklist for nurses in order to check medication compliance (Palmer, 2014). This was again different compared to the other guideline, in which nurses conducted checks based on counting remaining tablets or medicines. Also, a monitoring form was provided (Riley & Mills, 2014).

In conclusion, it is possible to state that the guidelines within the NHS hospitals were based on the NMC Standards for Medicines Management (Nursing and Midwifery Council, 2010). However, the content of included components varied. It was not possible to state the content of e.g. the patients' assessment was based on a body of literature or recent evidence concerning the topic. Also, the NMC withdrew their standards on March 28th 2018, as stated on their website; “However, it's not within our remit as a regulator to provide this type of clinical practice guidance, so we won't be replacing these standards”. A referral to the Royal Pharmaceutical Society for updates on professional guidance was provided.

Literature review on the types of self-administration of medication interventions in hospitals described a great diversity (Richardson et al., 2014; Wright et al., 2006). Two systematic reviews indicated the majority of their included studies on self-administration of medication had a variety of levels for a patient to complete during self-administration. A total of 12 studies out of 43 provided three levels, 10 studies provided one level, other studies had levels varying between two and nine (Richardson et al., 2014). Acute settings tended to have more single-stage approaches compared to rehabilitation wards (Wright et al., 2006). The vast majority of the self-administration intervention comprised an educational element, in which the pharmacist and/or nurse provided education (Richardson et al., 2014). Education was provided verbally or written; e.g. information sheets, diary cards, record sheets and compliance aids (Wright et al., 2006).

Abovementioned systematic reviews evaluated the structure of self-administration interventions. Evidence on the assessments used for evaluating the patients' competences in order to self-administer medication could not be obtained, as this was not discussed. Also, as previously stated, the assessments provided within the NHS guidelines for self-administration did not appear to be evidence based, nor were they validated instruments. Therefore, further literature research was performed on validated tools to examine patient's ability to self-administer medication in hospital. This search identified the self-administration of medication (SAM) screening tool. This tool was developed and validated in Australia on three medical wards by Manias et al (Manias, Beanland, Riley, & Hutchinson, 2006). The SAM screening tool consisted of two parts. The first part had to be answered by the patient and was filled in by an administrator. The patient's desire to self-manage was evaluated with the use of a visual analog scale. This scale questioned the patient about (1) whether he/she deems him/herself competent for managing regular medication independently while in hospital and (2) how much he/she would like to manage these regular medications while in hospital. Also, demographic data on the patient's discharge destination and responsibility for medication management following discharge was collected. The second part had to be filled in by the nurses if the patient was willing to self-manage. It consisted of questions on the patient's capability to self-medicate (11 questions), knowledge of medications and behavior (7 questions), and experience with self-medicating (6 questions). In the end, the nurse needed to make a global assessment with the use of a visual analog scale, resulting in a maximum score of 96 points. The cut-off was installed at 60, below this cut-off patients were not able to self-manage medication (Manias et al., 2006). Afterwards, a study by Anderson et al on the validity, reliability and utility of the SAM screening tool in a rehabilitation unit showed the SAM screening tool could be used to predict patient's ability to self-administer medication. Also, this tool identified itself as a more objective approach compared to healthcare professionals subjectively evaluating patients' abilities (Anderson, Manias, Kusljic, & Finch, 2014).

1.2.3 Evidence on the consequences of self-administration of medication in hospital

Self-administration of medication in hospital results in consequences for patients and healthcare providers. Two systematic reviews on the effect on outcomes related to the abovementioned stakeholders and one qualitative study on potential benefits and barriers to self-administration concerning patients' were identified (Manias, Beanland, Riley, & Baker, 2004; Richardson et al., 2014; Wright et al., 2006). In order to provide a structured overview, each consequence described in literature was listed separately.

a) Patient adherence/medication errors

Both systematic reviews evaluated patient adherence, one during self-administration of medication in hospital, the other after discharge. It was seen self-administering patients in hospital were significantly more adherent in five studies, compared to the control group (n= 9 studies). However, three studies

found lower adherence rates or even more errors in the self-administering group compared to controls. Adherence during self-administration in hospital was also measured over a period of time in four studies, one included high quality paper observed a significant reduction in non-compliant behavior. Descriptive studies (n= 7) reported high rates of adherence (40-100%) to medication regimens and error rates ranging from 2.5% - 7.5% (Richardson et al., 2014). Results on adherence after discharge were found to be inconclusive; therefore, conclusions could not be formulated (Wright et al., 2006).

b) Patient knowledge

The effect of self-administration of medication on the knowledge of patients on their own medication was tested in multiple studies. Following aspects concerning knowledge were evaluated: drug name, purpose, appearance, dosage, frequency and side effects. In both RCT's as non-RCT's, it seemed patient's knowledge on their own medication significantly increased. Yet, it is not possible to state which aspects of knowledge increased most as this varied between studies. Also, differences between the education provided (type of counselling), made it difficult to draw conclusions (Richardson et al., 2014; Wright et al., 2006). Concerning patients, self-administration of medication does allow respect for the patient's own knowledge on their medicines (Manias et al., 2004).

c) Patient satisfaction

The measurement of patient's satisfaction when self-administering medication showed some contradictory findings. On the one hand patients reported high satisfaction rates (90%-100%), on the other hand, 80% of questioned patients from the control groups stated they prefer nurse-administration if they could choose between self-administration or nurse-administration. These results seem to acknowledge patients who experienced self-administration are more likely to do so again. Also, the patient's age influenced the willingness for self-administration of medication; 45% of patients younger than 60 years of age were willing to self-administer compared to 18% of patients over 60 years of age (Richardson et al., 2014; Wright et al., 2006).

d) Staff satisfaction and workload

Only the systematic review by Richardson et al. provided a synthesis of evidence concerning the satisfaction of healthcare providers and possible effects on workload. It was observed healthcare providers very much preferred to use self-administration of medication interventions. They stated it would benefit structured teaching, multidisciplinary communication, nurse's medication knowledge and collaboration between the team and patient. Nevertheless, self-administration was stated to be time consuming and resulted in increased work stress and workload (preparing medication cards, clerical work, educating patients). Yet, it was also mentioned the invested time was eliminated if patients were following the protocol reliably and by saving time on prescriptions and dispensing, and drug rounds. It should be noted, currently no evidence on the actual time investment spent on education or facilitating self-administration of medication has been described in literature (Richardson et al., 2014). According to the opinion of patients, self-administration would lead to a decrease in time devoted to medication rounds. They confirmed it encourages a shared relationship and improves the nurse-patient relationship (Manias et al., 2004).

Conclusive notes on the history of self-management of medication, the prevalence, the current state of the art, and the consequences.

- ✓ Self-management of medication in hospital was already described in literature since 1959. Back then, it was described as 'bedside self-medication' and 'self-administered medications'. In recent times, it is referred to as 'self-administration of medication' (See appendix I for more information on terminology).
- ✓ Recent literature on the prevalence rates of self-administration of medication in hospital is scarce. A Belgian pilot study indicated 32% of hospitalized patients on medical and surgical wards were self-administering at least one medicine. Mostly policies in NHS hospitals for self-administration of medication are in place, yet they are only applied to a limited category of patients.
- ✓ Existing NHS guidelines for self-administration of medication showed variations in the included components. These guidelines were not based on a body of literature or recent evidence, and were withdrawn in March 2018 by the NMC.
- ✓ Academic literature on self-administration of medication showed a very diverse set of self-administration of medication interventions. The content of these interventions consisted of patients entering levels of self-administration, the majority included an educational element. Nevertheless, none of these interventions were thoroughly validated.
- ✓ One validated Australian assessment was identified. This SAM tool evaluated the patient's ability to self-administer medication in hospital.
- ✓ Literature reviews identified self-administration of medication lead to an increased adherence during hospitalization, increased patient medication knowledge, and increased patient satisfaction. Healthcare providers prefer self-administration of medication, yet the consequences on workload were unclear.

1.3 Problem statement

The definition of health and Dorothea Orem's General Theory of Nursing both stress out the importance of individuals being able to provide self-care and self-management. Within Orem's Theory of Nursing Systems, nurses should identify deficits related to self-care and possible actions should be defined in order to tackle them. In recent years, an evolution towards increased patient self-management and self-care was observed. This resulted in more actively involved patients and healthcare providers who provided a more empowering approach. Nevertheless, the increased focus on self-management, and the specific aspect of medication self-management, literature clearly described individuals still struggle during this process. These problems lead to an economic burden and a negative impact on several patient related outcomes. Therefore, focusing on the aspect of medication self-management is particularly important.

Bearing in mind Orem's Theory of Nursing Systems and a majority of individuals who do not succeed in medication self-management, allowing patients to self-manage their medicines in hospital under supervision and with support of healthcare providers needs to be stimulated. Medication self-management can provide continuity in the medication self-management process of the patient, detect problems related to medication self-management and intervene by for example providing education, and result in better medication self-management and therapy adherence.

Literature on the prevalence of self-administration of medication in hospital is limited. A Belgian pilot study identified self-administration of medication occurred, yet procedures or protocols lacked. An evaluation of existing guidelines for self-administration of medication in hospital identified they were not developed based on evidence, they were not validated, and were recently withdrawn. Systematic reviews on this topic described a range of diverse self-administration of medication interventions, also lacking an evidence based approach. Only one validated Australian assessment to evaluate the patient's ability to self-administer medication in hospital was identified. Literature on the effects of self-administration of medication suggested an increased patient adherence during hospitalization, increased patient medication knowledge, and increased patient satisfaction.

Notwithstanding, the existence of guidelines and several types of self-administration of medication interventions, these items were not sufficiently validated and it is not possible to state their development has been based on the existing body of evidence. Moreover, a Flemish pilot study confirmed procedures for self-administration were absent. In addition, the existing guidelines, self-administration of medication interventions and the identified validated Australian tool did not comply Belgian rules and regulation concerning self-administration of medication in hospital. Therefore, the need for further studying the topic of self-administration of medication in Belgian hospitals was confirmed and the SelfMED study was launched.

1.4 Research aims

The SelfMED study aimed:

Aim 1

To describe the legal context of self-administration of medication and current practices including the prevalence of self-administration of medication in Flemish hospitals.

Aim 2

To explore and describe the willingness of patients, nurses, physicians and hospital pharmacists to perform or allow self-administration of medication, their attitude towards it, and prerequisites and perceived consequences of self-administration in hospital.

Aim 3

To develop and validate an evidence based SelfMED procedure for self-management of medication by patients whilst in hospital, and to evaluate the number of medication administration errors and registration errors, and the feasibility after the implementation of the SelfMED procedure.

1.5 Outline of the thesis

In order to evaluate whether self-administration of medication fits within the current Belgian regulation, Chapter 2 aimed to explore the current legal context in relation to self-administration. Afterwards, we aimed to describe daily practices related to self-administration of medication in hospital. This comprised an evaluation of the prevalence rates of self-administration of medication in hospital, and the relationship between patient related and organizational factors (Chapter 3).

With the objective to explore and describe the willingness of all stakeholders towards self-administration, their attitude, prerequisites and consequences of self-administration of medication, both qualitative as quantitative studies were provided. Chapter 4 aimed to explore qualitatively healthcare providers' and patients' perspectives concerning self-management of medication in hospital. The use of a strengths, weaknesses, opportunities and threat (SWOT) analysis aimed to

provide insights in benefits, disadvantages, opportunities and threats for self-administration of medication. Afterwards, Chapter 5 and Chapter 6 aimed to further quantitatively investigate these results in order to evaluate the qualitative results in a larger sample of stakeholders with different backgrounds and environments. They aimed to quantitatively describe the willingness of all stakeholders (patients, nurses, physicians and hospital pharmacists) towards self-administration of medication, their attitude towards it, and prerequisites and perceived consequences of self-administration in hospital.

Based on the results of the abovementioned studies, evidence on the content of a procedure could be obtained. These results allowed us to develop the SelfMED procedure, which was validated afterwards (Chapter 7). Under Chapter 8 the SelfMED procedure was tested for the first time in daily practice. We aimed to evaluate the number of medication administration errors and registration errors, and the feasibility reported by the cardiologists after the implementation of the SelfMED procedure.

In conclusion, Chapter 9 confronts the research aims of the SelfMED project with the current findings, describes the strengths and limitations of this doctoral thesis, and describes the future of the SelfMED project.

Conclusive notes on the meaning of the term self-management of medication within the SelfMED project

- ✓ We define self-management of medication in hospital as patients who store, prepare and administer their medication themselves, if they comply with certain criteria. During the process of self-management of medication, patients are monitored and supported by nurses, physicians and hospital pharmacists.
- ✓ If problems occur during the act of medication self-management, these should be identified and addressed in order to prevent medication related problems after discharge. In addition, also patients who are not able to self-manage medication, yet are expected to self-manage after discharge, should be given the opportunity to learn to self-manage their medication whilst in hospital.

1.6 References

- Al-Qasem, A., Smith, F., & Clifford, S. (2011). Adherence to medication among chronic patients in Middle Eastern countries: review of studies. *East Mediterr Health J*, 17(4), 356-363.
- Anderson, J., Manias, E., Kusljic, S., & Finch, S. (2014). Testing the validity, reliability and utility of the Self-Administration of Medication (SAM) tool in patients undergoing rehabilitation. *Res Social Adm Pharm*, 10(1), 204-216. doi:10.1016/j.sapharm.2013.04.013
- Bailey, S. C., Annis, I. E., Reuland, D. S., Locklear, A. D., Sleath, B. L., & Wolf, M. S. (2015). Development and evaluation of the Measure of Drug Self-Management. *Patient Prefer Adherence*, 9, 1101-1108. doi:10.2147/ppa.s85411
- Bailey, S. C., Oramasionwu, C. U., & Wolf, M. S. (2013). Rethinking adherence: a health literacy-informed model of medication self-management. *J Health Commun*, 18 Suppl 1, 20-30. doi:10.1080/10810730.2013.825672
- Barlow, J., Wright, C., Sheasby, J., Turner, A., & Hainsworth, J. (2002). Self-management approaches for people with chronic conditions: a review. *Patient Educ Couns*, 48(2), 177-187.
- Caldeira, D., Vaz-Carneiro, A., & Costa, J. (2014). The impact of dosing frequency on medication adherence in chronic cardiovascular disease: systematic review and meta-analysis. *Rev Port Cardiol*, 33(7-8), 431-437. doi:10.1016/j.repc.2014.01.013
- Castro, E. M., Van Regenmortel, T., Vanhaecht, K., Sermeus, W., & Van Hecke, A. (2016). Patient empowerment, patient participation and patient-centeredness in hospital care: A concept analysis based on a literature review. *Patient Educ Couns*, 99(12), 1923-1939. doi:10.1016/j.pec.2016.07.026
- Conn, V. S., Ruppar, T. M., Enriquez, M., & Cooper, P. (2016). Medication adherence interventions that target subjects with adherence problems: Systematic review and meta-analysis. *Res Social Adm Pharm*, 12(2), 218-246. doi:10.1016/j.sapharm.2015.06.001
- Costa, E., Giardini, A., Savin, M., Menditto, E., Lehane, E., Laosa, O., Marengoni, A. (2015). Interventional tools to improve medication adherence: review of literature. *Patient Prefer Adherence*, 9, 1303-1314. doi:10.2147/ppa.s87551
- Cutler, R. L., Fernandez-Llimos, F., Frommer, M., Benrimoj, C., & Garcia-Cardenas, V. (2018). Economic impact of medication non-adherence by disease groups: a systematic review. *BMJ Open*, 8(1). doi:10.1136/bmjopen-2017-016982
- da Costa, F. A., Pedro, A. R., Teixeira, I., Braganca, F., da Silva, J. A., & Cabrita, J. (2015). Primary non-adherence in Portugal: findings and implications. *Int J Clin Pharm*, 37(4), 626-635. doi:10.1007/s11096-015-0108-1
- Davis, A., Muir, P., Allardice, J., Clark, K., Groves, J., Molenaar, M., & Robson, G. (2002). SHPA Guidelines for Self-Administration of Medication in Hospitals and Residential Care Facilities. *Journal of Pharmacy Practice and Research*, 32(4), 324-325. doi:doi:10.1002/jppr2002324324
- De Block, M. (2014). *Position paper - Public Health*. (DOC 54 0588/007). Retrieved from <https://www.deblock.belgium.be/nl/beleidsnota-gezondheidszorg-0>.
- De Vera, M. A., Bhole, V., Burns, L. C., & Lacaille, D. (2014). Impact of statin adherence on cardiovascular disease and mortality outcomes: a systematic review. *Br J Clin Pharmacol*, 78(4), 684-698.
- Fallis, B. A., Dhalla, I. A., Klemensberg, J., & Bell, C. M. (2013). Primary medication non-adherence after discharge from a general internal medicine service. *PLoS One*, 8(5), e61735. doi:10.1371/journal.pone.0061735
- Fitzgerald, A. A., Powers, J. D., Ho, P. M., Maddox, T. M., Peterson, P. N., Allen, L. A., Havranek, E. P. (2011). Impact of medication nonadherence on hospitalizations and mortality in heart failure. *J Card Fail*, 17(8), 664-669. doi:10.1016/j.cardfail.2011.04.011
- Glinn, J. (2013). Policy For Self Administration Of Medicines (SAM) By Competent Patients.
- Federal Public Service for Public Health (2018). Mijn gezondheid. Retrieved from <https://www.mijngezondheid.belgie.be>

- Huber, M., Knottnerus, J. A., Green, L., van der Horst, H., Jadad, A. R., Kromhout, D., Smid, H. (2011). How should we define health? *BMJ*, *343*, d4163. doi:10.1136/bmj.d4163
- London Audit Commission. (2001). *A Spoonful of sugar: Medicines Management in NHS Hospitals*. London, UK: Audit Commission.
- Mancia, G., Fagard, R., Narkiewicz, K., Redon, J., Zanchetti, A., Böhm, M., Wood, D. A. (2013). ESH/ESC Guidelines for the management of arterial hypertension The Task Force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC). *European Heart Journal*, *34*(28), 2159-2219. doi:10.1093/eurheartj/eh151
- Manias, E., Beanland, C., Riley, R., & Baker, L. (2004). Self-administration of medication in hospital: patients' perspectives. *J Adv Nurs*, *46*(2), 194-203. doi:10.1111/j.1365-2648.2003.02979.x
- Manias, E., Beanland, C. J., Riley, R. G., & Hutchinson, A. M. (2006). Development and validation of the self-administration of medication tool. *Ann Pharmacother*, *40*(6), 1064-1073. doi:10.1345/aph.1G677
- McCormack, D. (2003). An examination of the self-care concept uncovers a new direction for healthcare reform. *Nurs Leadersh (Tor Ont)*, *16*(4), 48-62.
- McLeod, M., Ahmed, Z., Barber, N., & Franklin, B. D. (2014). A national survey of inpatient medication systems in English NHS hospitals. *BMC Health Serv Res*, *14*, 93. doi:p
- Meleis, I. A. (2012). *Theoretical Nursing : Development & Progress* (5th ed.): Philadelphia : Wolters Kluwer.
- Mullen, R. J., Duhig, J., Russell, A., Scarazzini, L., Lievano, F., & Wolf, M. S. (2018). Best-practices for the design and development of prescription medication information: A systematic review. *Patient Educ Couns*, *101*(8), 1351-1367. doi:10.1016/j.pec.2018.03.012
- Murage, M. J., Tongbram, V., Feldman, S. R., Malatestinic, W. N., Larmore, C. J., Muram, T. M., . . . Araujo, A. B. (2018). Medication adherence and persistence in patients with rheumatoid arthritis, psoriasis, and psoriatic arthritis: a systematic literature review. *Patient Prefer Adherence*, *12*, 1483-1503. doi:10.2147/ppa.s167508
- Naderi, S. H., Bestwick, J. P., & Wald, D. S. (2012). Adherence to drugs that prevent cardiovascular disease: meta-analysis on 376,162 patients. *Am J Med*, *125*(9), 882-887.e881. doi:10.1016/j.amjmed.2011.12.013
- Nieuwlaat, R., Wilczynski, N., Navarro, T., Hobson, N., Jeffery, R., Keepanasseril, A., Haynes, R. B. (2014). Interventions for enhancing medication adherence. *Cochrane Database Syst Rev*(11), Cd000011. doi:10.1002/14651858.CD000011.pub4
- Nursing and Midwifery Council (2010). *NMC Standards for Medicines Management*. Retrieved from <https://www.nmc.org.uk/standards/standards-for-post-registration/standards-for-medicines-management/>
- Orem, D. E. (1995). *Nursing: Concepts of practice* (5th edition). St. Louis, MO: Mosby.
- Orem, D. E. (2001). *Nursing: Concepts of practice* (6th edition). St. Louis, MO: Mosby.
- Palmer, R., Finnegan, T., Darko, A. (2014). Guidelines for Patient Self-Administration of Medication (SAM).
- Parnell, M. A. (1959). Medicines at the bedside. *Am J Nurs*, *59*, 1417-1418.
- Richard, A. A., & Shea, K. (2011). Delineation of self-care and associated concepts. *J Nurs Scholarsh*, *43*(3), 255-264. doi:10.1111/j.1547-5069.2011.01404.x
- Richardson, S. J., Brooks, H. L., Bramley, G., & Coleman, J. J. (2014). Evaluating the effectiveness of self-administration of medication (SAM) schemes in the hospital setting: a systematic review of the literature. *PLoS One*, *9*(12), e113912. doi:10.1371/journal.pone.0113912
- Riley, C., & Mills, R. (2014). Self-Administration of Medicines Policy (for in-patients).
- Romero-Sanchez, J., Garcia-Cardenas, V., Abaurre, R., Martinez-Martinez, F., & Garcia-Delgado, P. (2016). Prevalence and predictors of inadequate patient medication knowledge. *J Eval Clin Pract*, *22*(5), 808-815. doi:10.1111/jep.12547

- Royal Pharmaceutical Society (2005). *The safe and secure handling of medicines: a team approach*. Retrieved from <https://www.rpharms.com/resources/professional-standards/safe-and-secure-handling-of-medicines>
- Sabate, E. (2003). *Adherence to Long-Term Therapies: Evidence for Action*. Geneva: World Health Organization.
- Simpson, S. H., Eurich, D. T., Majumdar, S. R., Padwal, R. S., Tsuyuki, R. T., Varney, J., & Johnson, J. A. (2006). A meta-analysis of the association between adherence to drug therapy and mortality. *BMJ*, *333*(7557), 15. doi:10.1136/bmj.38875.675486.55
- Tamblyn, R., Eguale, T., Huang, A., Winslade, N., & Doran, P. (2014). The incidence and determinants of primary nonadherence with prescribed medication in primary care: a cohort study. *Ann Intern Med*, *160*(7), 441-450. doi:10.7326/m13-1705
- Trappenburg, J., Jonkman, N., Jaarsma, T., van Os-Medendorp, H., Kort, H., de Wit, N., Schuurmans, M. (2013). Self-management: one size does not fit all. *Patient Educ Couns*, *92*(1), 134-137. doi:10.1016/j.pec.2013.02.009
- UKCC. (2002). *Standards for the Administration of Medicines*.: UKCC for Nursing Midwifery and Health Visitors.
- van Boven, J. F., Chavannes, N. H., van der Molen, T., Rutten-van Molken, M. P., Postma, M. J., & Vegter, S. (2014). Clinical and economic impact of non-adherence in COPD: a systematic review. *Respir Med*, *108*(1), 103-113. doi:10.1016/j.rmed.2013.08.044
- Vandeurzen, J. (2010). *Everybody is US. Vision paper the Flemish Division of Wellbeing, Public Health and Family 2009-2014*. Retrieved from <http://www.jovandeurzen.be/nl/beleidsdocumenten>.
- Vandeurzen, J. (2014). *Position paper Flemish Division of Wellbeing, Public Health and Family 2014-2019*. Retrieved from <http://www.jovandeurzen.be/nl/beleidsdocumenten>.
- Vanwesemael, T., Hellemaes, L., & Dilles, T. (2014). Self-administration of medication in hospitals: A prevalence study *Paper presented at the CARE4 International scientific nursing and midwifery congress Antwerp, Belgium*.
- Vrijens, B., Antoniou, S., Burnier, M., de la Sierra, A., & Volpe, M. (2017). Current Situation of Medication Adherence in Hypertension. *Front Pharmacol*, *8*, 100. doi:10.3389/fphar.2017.00100
- Vrijens, B., De Geest, S., Hughes, D. A., Przemyslaw, K., Demonceau, J., Ruppert, T., Urquhart, J. (2012). A new taxonomy for describing and defining adherence to medications. *Br J Clin Pharmacol*, *73*(5), 691-705. doi:10.1111/j.1365-2125.2012.04167.x
- WHO. (1948). *Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference*. Retrieved from www.who.int/governance/eb/who_constitution_en.pdf
- Wilkinson, A., & Whitehead, L. (2009). Evolution of the concept of self-care and implications for nurses: a literature review. *Int J Nurs Stud*, *46*(8), 1143-1147. doi:10.1016/j.ijnurstu.2008.12.011
- Wright, J., Emerson, A., Stephens, M., & Lennan, E. (2006). Hospital inpatient self-administration of medicine programmes: a critical literature review. *Pharm World Sci*, *28*(3), 140-151. doi:10.1007/s11096-006-9014-x
- Yeaw, J., Benner, J. S., Walt, J. G., Sian, S., & Smith, D. B. (2009). Comparing adherence and persistence across 6 chronic medication classes. *J Manag Care Pharm*, *15*(9), 728-740. doi:10.18553/jmcp.2009.15.9.728



Chapter 2

Legal aspects of self-management of medication in Belgian hospitals

Outline

2	Legal aspects of self-management of medication in Belgian hospitals	29
2.1	The hospital pharmacy and the hospital pharmacist	29
2.2	The physician	29
2.3	The nurse	29
2.4	Self-administration of medication in hospital	30

2 Legal aspects of self-management of medication in Belgian hospitals

When aiming to develop and implement an intervention for self-administration of medication in daily practice, this should be performed within the framework of the legal rules and regulation. Therefore, relevant aspects on Belgian healthcare regulation related to self-administration of medication were presented below.

2.1 The hospital pharmacy and the hospital pharmacist

The Royal Decree of March 4th 1991 defines the standards for hospital pharmacies. Article seven of this law states all medicines for providing a diagnosis or treatment of hospitalized patients should be delivered by the hospital pharmacist. In addition, article eight describes medicines should be distributed individually, based on the prescription in the name of the patient. These medicines should be distributed with the use of unit dose medication and the number of dispensed doses should be limited to a treatment duration of maximum five days. Article nine, fourth^o states the hospital pharmacist should actively cooperate with the nursing staff, this concerning the procedures for manipulating medicines and practical recommendations for safe usage of medicines and patient administration. In addition, hospital pharmacists should, in cooperation with the medical and nursing department, provide patient support in relation to their health during hospitalization and after discharge (article nine, sixth^o).

2.2 The physician

According to the Law on Medicinal Products (March 25th 1964), prescriptions can only be provided by healthcare professions who are allowed to by the Law on health professions (Mai 10th 2015). In case of medication prescription in hospital, physicians should provide the prescription for therapies.

2.3 The nurse

The Royal Decree of Mai 10th 2015 describes the pursuit of nursing. Activities that can be performed by nurses are divided into three levels.

A-activities Activities to observe, define and report on the physical, psychological and social health status of patients.

B-activities B1: Technical interventions without prescription of a physician.

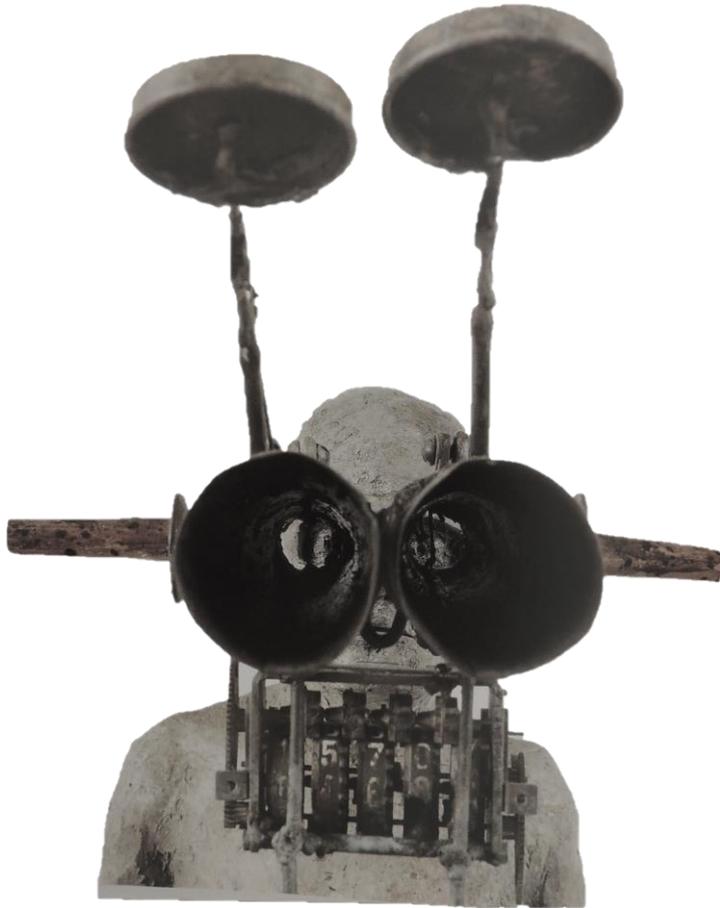
B2: Technical interventions with prescription of a physician.

C-activities Activities physicians can entrust to nurses.

Bearing in mind self-administration of medication, A-activities relate to observing, defining and reporting on the physical, psychological and social health status of patients in relation to the self-administered medication. Also, they relate to nurses supporting patients when self-administering medication, and providing them with information. B2-activities require a prescription of a physician. In order to administer medication, a medical prescription can be provided written (by hand, electronically or by fax) or an oral prescription (by phone or webcam), or by a standing order. In relation to medication administration, nurses are allowed to prepare and administer medication; oral, rectal, vaginal, subcutaneous, intramuscular, intravenous, by airway, hypodermoclysis, by a gastrointestinal catheter, by drain, eye drips, ear drips and percutaneous.

2.4 Self-administration of medication in hospital

There are no Royal Decrees that describe self-administration of medication. Nevertheless, the Care Inspection of the Flemish Division of Wellbeing, Public Health and Family provided rules to be adhered to. If self-administration of medication occurs, this has to be noted in the patient's personal medical file and it has to be clearly described which medication is self-administered and which is administered by nurses. Healthcare providers have a duty of care and a duty of surveillance at all time during hospitalization. If any problems occur during self-administration, these have to be noted in the patient's medical files. The treating physician is then held responsible (Care Inspection of the Flemish Division of Wellbeing, Public Health and Family, personal communication, October 2015).



Chapter 3

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

Outline

3	SelfMED: Self-administration of medication in hospital: a prevalence study in Flanders, Belgium	35
3.1	Abstract	35
3.2	Introduction	36
3.3	Methods	36
3.3.1	Design	36
3.3.2	Participants	37
3.3.3	Data collection	37
3.3.4	Instrument development	37
3.3.5	Data analysis	38
3.3.6	Ethical considerations	38
3.4	Results	38
3.4.1	Population	38
3.4.2	Prevalence of self-administration of medication	40
3.4.3	Reasons for prohibiting or allowing self-administration of medication	41
3.4.4	Organizational characteristics and patient-related characteristics associated with self-administration of medication	41
3.5	Discussion	43
3.6	Conclusions	44
3.7	Acknowledgment	44
3.8	Clinical resource	44
3.9	Supporting information	44
3.10	References	45

3 SelfMED: Self-administration of medication in hospital: a prevalence study in Flanders, Belgium

This chapter has been published as:

Vanwesemael, T., Van Rompaey, B., Petrovic, M., Boussey, K., & Dilles, T. (2017). *SelfMED: Self-Administration of Medication in Hospital: A Prevalence Study in Flanders, Belgium*. *J Nurs Scholarsh*, 49(3), 277-285. doi:10.1111/jnu.12290

3.1 Abstract

Background

Self-management is a key element in regaining and maintaining health. However, during hospitalization it becomes less obvious. Patient self-administration of medication during hospitalization is suggested to be beneficial to patient satisfaction, adherence to pharmacotherapy, and self-care competence.

Objectives

This study aimed to examine the prevalence of self-administration of medication during hospitalization, 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 hospitalized 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 1,269 patients participating in this study, 22% self-administered at least one medicine during hospitalization and 13.8% self-administered at least 50% of their total amount of medication. In the opinion of the head nurse, 40.9% of the hospitalized patients would have been able to self-administer their medication during hospitalization. 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 and female and had a lower number of different medications per day before and during hospitalization. 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.

Conclusions

Sometimes self-administration of medication was allowed. According to the surveyed nurses, however, more patients would be able to self-administer their medication during hospitalization. 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 organization of self-administration of medication on different wards.

3.2 Introduction

In 1948, the World Health Organization (WHO; 1948, p. 100) defined health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” Increasing criticism of 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 behaviors that persons use to manage the disease and its associated effects (Lorig & Holman, 2003; Trappenburg et al., 2013). Medication use is one of these behaviors used to manage the disease and its associated effects (Miller, Lasiter, Bartlett Ellis, & Buelow, 2015).

To support self-management of medication, healthcare 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. Healthcare professionals should not take over actions without considering the patient’s self-management abilities (Meleis, 2012; Orem, 2001).

However, during hospitalization, self-management of medication is not obvious. Recently, a guideline by 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” (Peninsula Community Health, 2014, p. 4).

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

So far, prevalence rates of self-administration of medication during hospitalization 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 hospitalization. The majority of these were oral medications (58%) or inhalation therapy (39%) (Vanwesemael, Hellemaes, & Dilles, 2014a, b). A recent study on the medication systems and processes used within the U.K. 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 hospitalization in Flanders, Belgium, and the relationship with patient-related and organizational factors.

3.3 Methods

3.3.1 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 organizational characteristics of the included wards.

3.3.2 Participants

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

3.3.3 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 policies. 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 healthcare 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's 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 4-point Likert scale. Data collected on medication characteristics concerned the number of medications taken at home, the number of medications taken during hospitalization, and the number and type of changes in the medication schedule used at home compared to the medication used during hospitalization. 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 hospitalization. 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.

3.3.4 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 pilottested for comprehensibility and item selection in a small-scale study on the prevalence of self-administration of medication in a regional hospital (n = 81) (Vanwesemael et al., 2014a, 2014b). As a result of this pilot test, five questions on demographic characteristics of the patient, two questions concerning medication characteristics, and three questions on self-administered medications were added. Afterwards, the adapted questionnaires were presented to a panel of practicing nurses, physicians, and a hospital pharmacist. This resulted in minor alterations in some answer categories.

3.3.5 Data analysis

The Statistical Package for Social Sciences (SPSS) version 23.0 (SPSS Inc, Chicago, IL, USA) was used to analyze 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 hospitalization, and number of self-administered medications during hospitalization. Nonparametric statistics were used to analyze 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 nonparametric statistics (Mann-Whitney test for continuous variables and chi-square test for discontinuous variables). To explore the relationship between patient-related characteristics and self-administration of medication, stepwise multiple logistic regression was applied. Because 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 of ≤ 0.05 was considered as statistically significant.

3.3.6 Ethical considerations

Before the start of the study, approval was obtained from an ethics committee (reference B670201523494). For each participating ward, 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.

3.4 Results

3.4.1 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 2, the wards had a mean of 29 available and 24 occupied beds.

Ward Characteristics (n = 56)		
Type of ward (%)		
	Surgical ward	32.1
	Medical ward	19.6
	Rehabilitation ward	10.7
	Geriatric ward	10.7
	Psychiatric ward	8.9
	Surgical Short stay	7.1
	Maternity	1.8
	Others	8.6
	Number of beds (mean [range])	29 [18-64]
	Number of occupied beds (mean [range])	24 [8-62]

Table 2. Ward characteristics

At inclusion, 1,269 patients were hospitalized at the participating wards; none refused participation. The mean age was 64 years, and 51.2% were female. The majority of the patients were living at home before hospitalization (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%; Table 3).

Participant characteristics (n = 1,269)		
Male (%)		48.8
Age (mean [range])		64 ± 18.7
Pre-hospitalisation environment (%)		
	Home	76.1
	Other hospital	8.8
	Internal transfer	8.8
	Nursing home	3.6
	Rehabilitation	0.9
	Unknown	0.2
	Other	1.7
Post-hospitalisation environment (%)		
	Home	69.1
	Unknown	10.5
	Nursing home	9.6
	Rehabilitation	4.4
	Other	4.2
	Other hospital	2.2
Care dependency (%)		
	Independent	25.3
	Mildly dependent	38.6
	Dependent	17.7
	Completely dependent	18.4
Overall health status (%)		
	Good	21.6
	Rather good	42.6
	Rather bad	28.2
	Bad	7.5

Table 3. Participant Characteristics (n = 1,269)

Additional analysis (Table A1, appendix II) showed differences based on gender. Men were on average younger (men: 63 years; women: 66 years; $p = .002$), were less likely to go home (men: 66.8%; women: 71.3%; $p < .001$), had higher care dependency levels (men: 22.0%; women: 15.0%; $p = .013$), and had a lower general health status (rather bad health status of men: 32.0%; women: 24.7%; bad health status of men: 9.6%; women: 5.6%; $p < .001$).

Hospitalized patients took on average six different medications at home and nine within the hospital. In 75.0% of the hospitalized 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 six medications taken by men and seven by women ($p = .002$). Furthermore, a correlation between the age and the amount of medications taken before hospitalization and during hospitalization, respectively $r = 0.276$ and $r = 0.232$, was found ($p < .001$).

Tables 4 and 5 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 hospitalization; only four wards (7.1%) had a screening tool to assess patients' competence to self-

administer their medication during hospitalization. On 37 wards (74%), some patients used medication brought from home during hospitalization. In half of the included wards (55.4%), less than 20% of their patients stored their medication in their own room. These medications were 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%).

Medication management characteristics at level of the ward (n = 56)	
Presence of SMM procedure* (%)	17.9
Presence of screening tool for SAM* (%)	7.1
Use of home medicines during hospitalisation (%)	74.0
Storage of medicines in the patient room (%)	
No storage	8.9
< 20% of the patients	55.4
20 – 50 % of the patients	16.1
51 – 80 % of the patients	10.7
> 81% of the patients	8.9
Way of storing medicines in the patient room (%) ^a	
Closet of the patient in the patient room	64.3
Medicine package	62.5
Medicine box	44.6
Safe of the patient in the patient room	7.1

Note: SAM = self-administration of medication.

^a Multiple answers were allowed.

Table 4. Medication management characteristics at level of the ward

Medication management characteristics at level of the patient (n = 1,091)	
Number of medicines taken before hospitalisation (n= 1091) (mean [range])	6.4 [0-30]
Number of medicines taken during hospitalisation (mean [range])	9.2 [0-34]
Changes in medicines caused by hospitalization (n= 1119) (%) ^a	75.0

^a Multiple answers were allowed.

Table 5. Medication management characteristics at level of the patient

3.4.2 Prevalence of self-administration of medication

Self-administration of medication was considered in 25.0% of the hospitalized patients (n= 300). The decision-making process of allowing self-administration of medication was a generally shared endeavor. 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 between the nurse, treating physician, patient, and the patient's family; and in 6% of cases between 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.

Of 1,269 patients, 278 (22%) self-administered at least one medicine during hospitalization, 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 hospitalization). Moreover, 13.8% of the patients self-administered at least 50% of the total amount of prescribed medication, and 5.8% of these patients self-administered 100% of the total amount of prescribed medication. The majority of self-administered medications were 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 hospitalization) 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 hospitalization.

3.4.3 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 was already self-administering medication at home (82.2%), and the patients' ability to ask for advice concerning their medication (80.8%; Table A2, appendix II).

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

3.4.4 Organizational characteristics and patient-related characteristics associated with self-administration of medication

In order to evaluate whether organizational 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%; $p = .037$). 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 self-administered at least 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 hospitalization were more frequently female (16.7% women vs. 10.8% men, $p = .003$) and on average younger (self-administering patients: 52.7 years; non self-administering patients: 66.4 years; $p < .001$). 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%; $p < .001$). Patients living at home before hospitalization 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 hospitalization self-administered their medication more often (17.5%) compared to patients with other discharge destinations (5.4%; $p < .001$). 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; $p < .001$). Patients self-administering

medication took a lower amount of different medications during their hospitalization 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; $p < .001$ and $p = .005$).

The multivariate analysis of the above-mentioned variables (see Table 6) resulted in a model explaining 30.3% of the variance ($p < .001$). In this model, being a woman resulted in 55% more chance to self-administer (relative risk [RR] = 1.55; 95% confidence interval [CI] [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; 95% CI [1.71–6.84] and RR = 3.70; 95% CI [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 hospitalization (RR = 0.49; 95% CI [0.32–0.73]). For each year of age increased, the odds of self-administering medication decreased with 3.0% (RR = 0.97; 95% CI [0.96–0.98]). Each extra medicine taken during hospitalization resulted in 17.0% less self-administration of medication (RR = 0.83; 95% CI [0.77–0.89]). Compared to the medication taken at home, each extra medicine taken at home before hospitalization resulted in 16.0% increase of self-administration medications (RR = 1.16; 95% CI [1.08–1.25]).

Factors related to self-administration of medication	Univariate (n= 1269)			Multivariate ^b (n= 1250)
	% ^c	p-value	RR [CI 95%]	RR [CI 95%]
Sex				
Female	16.7	0.003	1.65 [1.19-2.30]	1.55 [1.03-2.31]
Male	10.8		ref	ref
Care dependency				
Independent -mildly dependent	20.3	<0.001	10.19 [5.46-19.00]	3.42 [1.71-6.84]
(Completely) dependent	2.4		ref	ref
Health status				
(Rather) good	20.3	<0.001	10.14 [5.44-18.90]	3.70 [1.85-7.39]
(Rather) bad	2.5		ref	ref
Pre-hospitalisation environment				
Home	16.0	<0.001	2.43 [1.52-3.87]	/
Other	7.3		ref	
Post-hospital environment				
Home	17.5	<0.001	3.70 [2.30-5.93]	/
Other	5.4		ref	
Changes in home medicine schedule ^d				
Yes	10.9	<0.001	0.40 [0.28-0.56]	0.49 [0.32-0.73]
No	23.7		ref	ref
	Mean ^e			
	Yes	No	p-value	RR [CI 95%]
Age (year)	52.7	66.4	<0.001	0.96 [0.96-0.97]
Number of medicines taken during hospitalisation	6.5	9.9	<0.001	0.85 [0.81-0.88]
Number of medicines taken before hospitalisation	5.5	6.6	0.005	0.95 [0.91-0.99]

Note. CI = confidence interval; ref = reference; RR = relative risk; / = these variables were not included in the model. ^a Self-administration of medication; this concerned patients self-administering $\geq 50\%$ of their medications. ^b R^2 (Nagelkerke) = 0.303; p value of the model $< .001$. ^c Proportion of patients self-administering medication. ^d Changes in the home medication schedule of the patient caused by hospitalization. ^e Mean value of self-administering or not self-administering patients.

Table 6. Influence of patient- or medication-related characteristics on self-administration of medication: logistic regression analysis

3.5 Discussion

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

The study sample was representative for patients hospitalized 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 and female, and had a lower number of different medications per day before hospitalization and during their hospital stay. More often, they came from their own home environment and returned there after discharge. Self-administering patients had a better general health status and lower care dependency levels. Other research involving a population of patients who did not self-administer medication during hospitalization showed that patients under 60 years of age had a significantly greater desire to self-administer their medication in hospital, compared to patients over 60 years of age (Deeks & Byatt, 2000). Combined with the rationale to prohibit or allow self-administration of medication, these results described 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 patients' competence 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 patients' competence to self-administer their medication during hospitalization. These data confirm the need for a uniform protocol and a uniform screening tool to assess 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 NHS, which provides health care for all U.K. citizens, in different NHS Trusts (London 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 (JCI, 2013).

A policy for self-administration of medication for inpatients is necessary. This policy should consist of a procedure on self-administration of medication during hospitalization; an assessment to decide whether patients are appropriate to self-administer medication; an observation tool to monitor medication adherence while self-administering medication; and 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, for example, 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 active cooperation with the nurses who administer medication (Royal Decree, 1991). The involvement of hospital pharmacists during this study was practically nonexistent. 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, for 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 health care, 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, and social and legal context. Furthermore, self-management of medication demands not only that the patient administers 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 more person-centered care, thereby allowing more self-management of patients during hospitalization. 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.

3.6 Conclusions

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 hospitalization and 7.1% of the wards had a screening tool to assess patients’ competence to self-administer medication. Self-administering patients were on average younger and female, and had a lower number of different medications per day before and during hospitalization. These patients had a good health status, and were independent to mildly dependent on nurses on the ward.

3.7 Acknowledgment

Research for this paper was financially supported by the Thomas More University College.

3.8 Clinical resource

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

3.9 Supporting information

Additional Supporting Information may be found in Appendix II (Table A1. Differences in Participant Characteristics Between Men and Women Table A2. Reasons for Prohibiting or Allowing Self-Administration of Medication) and in the online version of this article at the publisher’s website.

3.10 References

- Barnason, S., Zimmerman, L., Hertzog, M., & Schulz, P. (2010). Pilot testing of a medication self-management transition intervention for heart failure patients. *Western Journal of Nursing Research, 32*(7), 849–870. doi:10.1177/0193945910371216
- Deeks, P. A., & Byatt, K. (2000). Are patients who self-administer their medicines in hospital more satisfied with their care? *Journal of Advanced Nursing, 31*(2), 395–400.
- Huber, M., Knottnerus, J. A., Green, L., van der Horst, H., Jadad, A. R., Kromhout, D., Smid, H. (2011). How should we define health? *British Medical Journal, 343*. doi:10.1136/bmj.d4163
- Joint Commission International. (2013). *Joint Commission International accreditation standards for hospitals-Standards-only version*. 5th ed. Oak Brook, IL: Author.
- London Audit Commission. (2001). *A spoonful of sugar: Medicines Management in NHS Hospitals*. London, UK.
- Lorig, K. R., & Holman, H. (2003). Self-management education: History, definition, outcomes, and mechanisms. *Annals of Behavioral Medicine, 26*(1), 1–7.
- McLeod, M., Ahmed, Z., Barber, N., & Franklin, B. D. (2014). A national survey of inpatient medication systems in English NHS hospitals. *BMC Health Services Research, 14*, 93. doi:10.1186/1472-6963-14-93
- Meleis, A. I. (2012). *Theoretical nursing: Development and progress*. Philadelphia, PA: Wolters Kluwer Health/Lippincott Williams & Wilkins.
- Miller, W. R., Lasiter, S., Bartlett Ellis, R., & Buelow, J. M. (2015). Chronic disease self-management: A hybrid concept analysis. *Nursing Outlook, 63*(2), 154–161.
- Orem, D. E. (2001). *Nursing: Concepts of practice*. St. Louis, MO: Mosby.
- Peninsula Community Health. (2014). Guidelines for patient self-administration of medication (SAM) (Reference CGP20). Retrieved from <http://studylib.net/doc/8439031/patient-self-administration-of-medicine-sam>
- Richardson, S. J., Brooks, H. L., Bramley, G., & Coleman, J. J. (2014). Evaluating the effectiveness of self-administration of medication (SAM) schemes in the hospital setting: A systematic review of the literature. *PLoS One, 9*(12), e113912. doi:10.1371/journal.pone.0113912
- Royal decree setting out the standards which hospital pharmacies must meet to be authorized. (1991). §§ 9°4.
- Tran, T., Elliott, R. A., Taylor, S. E., & Woodward, M. C. (2011). A self-administration of medications program to identify and address potential barriers to adherence in elderly patients. *Annals of Pharmacotherapy, 45*(2), 201–206. doi:10.1345/aph.1P473
- Trappenburg, J., Jonkman, N., Jaarsma, T., van Os-Medendorp, H., Kort, H., de Wit, Schuurmans, M. (2013). Self-management: One size does not fit all. *Patient Education and Counseling, 92*(1), 134–137. doi:10.1016/j.pec.2013.02.009
- Vanwesemael, T., Hellemaes, L., & Dilles, T. (2014a). *Self-administration of medication in hospitals: A prevalence study*. Paper presented at the Belgian Society of Pharmacoepidemiology Antwerp, Ghent.
- Vanwesemael, T., Hellemaes, L., & Dilles, T. (2014b). *Self-administration of medication in hospitals: A prevalence study*. Paper presented at the CARE4 International scientific nursing and midwifery congress Antwerp, Belgium.
- World Health Organization. (1948, June). *Preamble to the Constitution of the World Health Organization*. Presented at the International Health Conference, New York.
- World Health Organization. (2014). *WHO Collaboration Centre for Drug Statistics Methodology*. Retrieved from http://www.whocc.no/atc/structure_and_principles/



Chapter 4

Self-management of medication during hospitalisation: Healthcare providers' and patients' perspectives

Outline

4	Self-management of medication during hospitalisation: Healthcare providers' and patients' perspectives	49
4.1	Abstract	49
4.2	Introduction	50
4.3	Background	50
4.4	Methods	51
4.4.1	Design	51
4.4.2	Sample	51
4.4.3	Topic guide	52
4.4.4	Data collection	52
4.4.5	Data analysis	53
4.4.6	Ethical considerations	53
4.4.7	Rigour of the research process	53
4.5	Results	53
4.5.1	Population	53
4.5.2	Strengths of self-management of medication	54
4.5.3	Weaknesses of self-management of medication	57
4.5.4	Opportunities for self-management of medication	59
4.5.5	Threats for self-management of medication	61
4.5.6	Conditions for allowing self-management of medication	63
4.6	Discussion	65
4.6.1	Main findings	65
4.6.2	Implications for practice—process changes advised for implementing self-management of medication	66
4.6.3	Strengths and limitations	69
4.7	Conclusions	69
4.8	Acknowledgements	69
4.9	Contributions	69
4.10	ORCID	69
4.11	References	70

4 Self-management of medication during hospitalisation: Healthcare providers' and patients' perspectives

This chapter has been published as:

Vanwesemael, T., Boussey, K., Manias, E., Petrovic, M., Fraeyman, J., & Dilles, T. (2018). *Self-management of medication during hospitalisation: Healthcare providers' and patients' perspectives*. *J Clin Nurs*, 27(3-4), 753-768. doi:10.1111/jocn.14084

4.1 Abstract

Aims and objectives

To explore healthcare providers' and patients' perspectives on self-management of medication during the patients' hospital stay.

Background

Self-administration of medications relates to the process in which hospitalized patients—instead of healthcare professionals—prepare and consume medications by themselves. Literature suggests possible advantages of medication self-management such as increased patient satisfaction, adherence to pharmacotherapy and self-care competence.

Design

A qualitative descriptive study design was adopted, using semi-structured interviews and qualitative content analysis to examine data.

Methods

Six physicians, 11 nurses, six hospital pharmacists and seven patients were recruited from one regional hospital and two university hospitals, situated in Belgium. Interviews were conducted between October 2014–January 2015.

Results

Strengths of medication self-management were described by participants, relating to benefits of self-management for patients, time-saving benefits for nurses and benefits for better collaboration between patients and healthcare providers. Weaknesses were also apparent for patients as well as for nurses and physicians. Opportunities for self-management of medication were described, relating to the organisation, the patient and the process for implementing self-management. Threats for self-management of medication included obstacles related to implementation of self-managed medications and the actual process of providing medication self-management. A structured overview of conditions that should be fulfilled before allowing self-management of medication concerned patient-related conditions, the self-managed medication and the organisation of self-management of medication.

Conclusions

This study provides new insights on the strengths, weaknesses, opportunities and threats from the perspectives of key stakeholders. Interpretation of these findings resulted in an overview of adaptations in the medication management process to facilitate implementation of self-management of medication.

Relevance to clinical practice

A medication management process for self-management of medication was proposed. Further interventional studies are needed to test and refine this process before implementing it in daily practice.

4.2 Introduction

In hospitals, there has been a shift from a paternalistic approach, in which a patient receives health care in a passive way, towards an approach in which the patient becomes an active partner in health and disease management (Barlow, Wright, Sheasby, Turner, & Hainsworth, 2002; Trappenburg et al., 2013). Approaching patients as active partners is supported by the World Health Organization, as demonstrated by the Framework on Integrated People-Centred Health Services and the Orem Self-Care Theory (Meleis, 2012; Orem, 2001; WHO, 2016). An example of providing and enhancing active participation of patients in hospitals is allowing and supporting self-management.

As defined by Huber et al. (2011), health is “the ability to adapt and self manage in the face of social, physical, and emotional challenges”. In contemporary society, self-management is a major way in which individuals can actively be involved in their healthcare regimen. Trappenburg et al. examined determinants of self-management by undertaking pooled evidence of studies of patients with chronic heart failure, hypertension, asthma, chronic obstructive pulmonary disease (COPD), type 2 diabetes mellitus, musculoskeletal pain and patients taking oral anticoagulation. They found that self-management positively affected a variety of outcomes, such as clinical outcomes, quality of life, self-management behaviour and reduced healthcare costs (Trappenburg et al., 2013). This study focused on self-management of medications, which is one component of self-management.

What does this paper contribute to the wider global clinical community?

- This study provides new insights on the strengths, weaknesses, opportunities and threats regarding self-management of medication from the perspectives of patients, nurses, physicians and hospital pharmacists.
- The study findings show lack of clarity concerning prerequisites for the implementation of medication self- management in hospital. Therefore, this study provides a medication management process for self-management of medication in hospital to facilitate implementation in daily practice.
- The suggested medication management process for self-management of medication should be validated during future research in order to facilitate its use in daily practice.

4.3 Background

Self-administration of medication relates to the process in which patients prepare and consume medications themselves rather than a health professional taking on this role. Self-administration of medication in hospital was first mentioned in the literature in 1959, and it

has been studied internationally for many years (Parnell, 1959; Richardson, Brooks, Bramley, & Coleman, 2014; Wright, Emerson, Stephens, & Lennan, 2006). Compared to self-administration of medication, self-management of medication includes more than allowing the patient to perform the act of self-administering medication. Selfmanagement of medication in hospital includes a broader range of activities such as patient education about medication, and monitoring patients while self-managing their medication (Vanwesemael, Van Rompaey, Petrovic, Boussery, & Dilles, 2017).

Literature suggests that self-administration of medication provides some advantages over administration of medication by nurses, such as increased patient satisfaction and improved adherence to pharmacotherapy and self-care competences. Results on the impact of medication administration errors (MAEs) are not conclusive. Studies on the prevalence and the causes of MAEs in

hospitals indicate that the prevalence of errors is high (8.6%–28.3%), and multiple systems factors influence this prevalence (Keers, Williams, Cooke, & Ashcroft, 2013a,b). Studies on self-administration MAEs lack methodological rigour; therefore, more experimental studies are needed (Barnason, Zimmerman, Hertzog, & Schulz, 2010; Richardson et al., 2014; Tran, Elliott, Taylor, & Woodward, 2011; Wright et al., 2006).

A cross-sectional multicentre observational study of Belgian hospitals showed that 22% of the 1269 patients did self-administer at least one medication during their hospitalisation. Nurses stated that 41% of the hospitalised patients would have been able to self-administer their medication during their hospital stay. Only few wards had a procedure or screening tool to assess the competences of the patients to self-administer their medication. None of the wards had a validated procedure (Vanwesemael et al., 2017). A national survey of inpatient medication systems in English National Health Service (NHS) hospitals by McLeod, Ahmed, Barber, and Franklin (2014) concluded that 39% of the hospitals had a self-administration of medication policy (n = 100).

In Belgium, it is legally possible to allow self-management of medications in hospital. Yet, this has to be registered in the patients' personal medical file, and it has to be clearly defined which medications the patient self-manages and which are administered by nurses. During hospitalisation, healthcare providers have a "duty of care" and a "duty of surveillance." If problems concerning medication arise, these have to be registered in the patients' personal medical file. The treating physician is responsible for allowing and evaluating self-management of medication (Care inspection of the Flemish division of Wellbeing, Public Health and Family, personal communication, October 2015). The London Audit Commission encouraged self-management of medication in hospital by patients, and described it as a quality standard and a target for medicines management in their report on medicines management in NHS hospitals (London Audit Commission, 2001). Recently, Palmer, Finnegan and Darko published a guideline for patient self-administration of medication during hospitalization (Palmer, Finnegan, & Darko, 2014).

In order to increase the implementation of self-management of medication, it is necessary to have an insight into the perspectives of stakeholders concerning this topic. At the moment, it is unclear how various aspects of self-management of medication are managed in different hospitals, and the factors that facilitate or impede implementation. Furthermore, there is a relatively small body of evidence that addresses the opinions of key stakeholders including patients, nurses, physicians and hospital pharmacists. Nevertheless, they remain key stakeholders and are a crucial factor in implementing self-management on a daily basis in practice. Hence, the aim of this research was to explore healthcare providers' and patients' perspectives concerning self-management of medication in hospital.

4.4 Methods

4.4.1 Design

A qualitative descriptive research design was used. This type of research design was appropriate, because as described by Sandelowski this design is "especially amenable to obtaining straight and largely unadorned (e.g., minimally theorized or otherwise transformed or spun) answers to questions of special relevance to practitioners and policy makers." This design was adopted to explore healthcare providers' and patients' perspectives concerning the strengths, weaknesses, opportunities and threats of self-management of medication during patients' hospitalisation (Sandelowski, 2000).

4.4.2 Sample

We sought to capture many different perceptions on self-management of medication and therefore used a purposive sampling strategy (Palinkas et al., 2015; Patton, 2002). Under the assumption that

there would be differences in medication management, procedures or protocols, we recruited one regional private hospital (451 beds), one public university hospital (1,061 beds) and one private university hospital (573 beds) in Belgium. All hospital management teams consented to participate. The following wards were excluded because of limited opportunities for self-management of medication: paediatrics, maternity, palliative care units, emergency departments, intensive care units, operation rooms and day hospitals.

Healthcare providers were selected after consultation with the director of nursing. Inclusion criteria for healthcare providers consisted of individuals who were directly involved in the management of patients' medication and were employed as a nurse, physician or hospital pharmacist. To obtain as many physicians and nurses with different specialties as possible, no more than two healthcare professionals from the same speciality were included from each hospital. With respect to gender parity, both male and female healthcare providers were included. Exclusion criteria comprised nurses, physicians or hospital pharmacists who were not directly involved in the management of patients' medication or who were temporarily employed health professionals.

In consultation with the head nurse or representative, potential patients were identified for the study. Patients were included if the following inclusion criteria were fulfilled. Patients had to be admitted to wards that were involved in the study, were aged older than 18 years and were mentally and physically able to articulate an opinion about the topic, as assessed by the head nurse. To obtain patients from different wards, no more than one patient per ward was included. Exclusion criteria comprised patients who were physiologically or mentally unstable.

We aimed to obtain a diverse sample of healthcare providers and patients by recruiting individuals of different age and situated in various settings. Data collection of new participants was ceased when no new themes arose from the interviews, and as such, saturation was reached. This process was assessed during the process of data analysis and after reflection with one co-author. Data collection and analysis therefore occurred in parallel with each other.

4.4.3 Topic guide

The topic guide was based on a literature review and a pilot study. First, a review of literature was undertaken on self-management of medication, with particular reference to possible strengths, weaknesses, opportunities and threats of self-management of medication. This process resulted in a topic guide with four questions (Box 1, questions 1–4). Afterwards, the semi-structured interview schedule was pilot-tested for comprehensibility. This test was conducted with three nurses, three patients and a hospital pharmacist. The questions were found to be clear and comprehensible. Interviews were conducted in Dutch. Additional information was collected on the gender and type of ward or healthcare discipline for healthcare providers and on the gender and hospital ward for patients.

4.4.4 Data collection

Data were collected using a semi-structured interview approach. The interviews were conducted in Dutch, between October 2014–January 2015, and a topic guide was used (see Box 1). The interviews were audio-recorded and conducted by one member of the research team. All interviews took place in a quiet room in the hospital ward. If necessary, terms such as opportunities or threats were explained. Strengths were described as characteristics of self-management that provide advantages, and weaknesses were described as characteristics of self-management that provide disadvantages. Opportunities were described as characteristics that make self-management possible, while threats were described as characteristics that make self-management impossible.

Box 1 Main questions from the topic guide

1. What would be the strengths for patients or healthcare providers (doctors, nurses, hospital pharmacists) if patients self-manage their medication while in hospital?
2. What would be the weaknesses for patients or healthcare providers (doctors, nurses, hospital pharmacists) if patients self-manage their medication while in hospital?
3. Which threats are present for patients or healthcare providers to self-manage medication while in hospital?
4. Which opportunities are present for patients or healthcare providers to self-manage medication while in hospital?
5. Which conditions should be fulfilled before you would allow self-management of medication?

4.4.5 Data analysis

The interviews were transcribed verbatim by the interviewer. The data were managed using the NVivo 10 program and undertaking a qualitative content analysis (Hsieh & Shannon, 2005). For each group, nurses, hospital pharmacists, physicians and patients, data were repeatedly read to obtain familiarisation. For each healthcare discipline group, several codes emerged out of the data. These codes were clustered in line of the research question: strengths, weaknesses, opportunities and threat (SWOT). Because of a large amount of different codes for the SWOT grouping, codes were assigned to categories, resulting in meaningful clusters, for example, benefits for patients. To increase the trustworthiness, each step of the analyses was discussed with a co-author (Vaismoradi, Turunen, & Bondas, 2013). A language editing service performed the translations of the quotations.

4.4.6 Ethical considerations

Before the commencement of this study, the Ethics Committee of the University Hospital of Antwerp provided approval (reference B300201422410). Each participant signed informed consent, agreeing the interview was audio-taped. Participation was voluntary and confidentiality was assured for all participants of interviews. Participants were informed that they could withdraw from the study at any time.

4.4.7 Rigour of the research process

To obtain rigour during the data collection process, the first author conducted all interviews with participants to ensure consistency of approach. All interviews were conducted using a semi-structured topic guide. To obtain rigour during the data analysis, the data transcripts were read several times. To increase the trustworthiness, each step of the analyses was discussed with one co-author. Any disagreement was resolved through discussion.

4.5 Results

4.5.1 Population

A total of six physicians, 11 nurses, six hospital pharmacists and seven patients were interviewed. Table 7 shows more details on the sample who has been interviewed. The interviews ranged from 8–42 min. On average, an interview with a physician took 24 min [range 20–29 min], a nurse took 25 min [range 19–43 min], a hospital pharmacist took 25 min [range 19–29 min] and a patient took 12 min [range 8–20 min].

Characteristics (n= 30)		Hospital 1	Hospital 2	Hospital 3
Hospital characteristics				
Type of hospital		regional private hospital	private university hospital	public university hospital
Number of hospital beds		451	573	1061
Codes interviewed groups * <i>Specialty area</i>				
Patients		P1, P3, P4 <i>gastro-oncology, pulmonology-nephrology, general surgery</i>	P5, P7 <i>gastroenterology, cardiology-nephrology</i>	P6, P8 <i>endocrinology nephrology</i>
Nurses		N1 - N4 <i>pulmonology-nephrology, gastro-oncology, geriatrics, general surgery</i>	N5 - N8 <i>gastroenterology, geriatrics, cardiology-nephrology, geriatrics</i>	N9 - N11 <i>endocrinology, nephrology, neurology</i>
Treating physicians		TP1 - TP3 <i>pulmonologist, geriatrician, endocrinologist</i>	TP4 <i>geriatrician</i>	TP5, TP6 <i>cardiologist, nephrologist</i>
Hospital pharmacists		HP1, HP2 <i>hospital pharmacy</i>	HP3, HP4 <i>hospital pharmacy</i>	HP5, HP6 <i>hospital pharmacy</i>
Patients				
	Male	0	0	1
	Female	3	2	1
Nurses				
	Male	0	0	1
	Female	4	4	2
Treating physicians				
	Male	2	1	1
	Female	1	0	1
Hospital pharmacists				
	Male	1	0	2
	Female	1	2	0
Duration of the interviews (minutes, mean, SD)				
	Patients	13 [9-20]	12 [11-13]	11 [8-13]
	Nurses	23 [19-29]	27 [19-43]	27 [20-32]
	Treating physicians	24 [20-28]	29	23 [18-27]
	Hospital pharmacists	29 [29-29]	22 [19-24]	24 [20-28]

P: patient, N: nurse, TP: treating physician, HP: hospital pharmacist.

* For each person in each group an individualised code was used.

Table 7. Characteristics of the interviewed groups per hospital

4.5.2 Strengths of self-management of medication

Healthcare providers and patients believed that self-management of medication could have a number of strengths. These strengths were subdivided into three main themes: benefits for patients, benefits for nurses and benefits for collaboration (see Table 8).

Strengths of self-management of medication	Stated by			
	Nurses	Hospital pharmacists	Physicians	Patients
Benefits for patients				
- continuing the medication management routines from home whilst in hospital	x	x	x	x
- enhancing medication adherence	x	x	x	x
- practicing their therapy in a controlled hospital environment	x	x	x	x
- practicing medication will result in a better therapeutic adherence after discharge		x	x	
- practicing medication will result in an increased patient confidence towards medication management before discharge	x			
- increased medication knowledge caused by education and independency training	x	x		
- patients would feel more autonomous and independent	x	x	x	x
- increased patient satisfaction			x	
- patients can let go of the roll of controlling nurses of administering medication correct				x
- patients can control their medication intake and therefor have full control on their health/illness				x
- safer medication management	x		x	x
Benefits for nurses				
- self-management of medication is time-saving for nurses because patients do prepare and administer medication themselves	x	x	x	
- self-management of medication is time-saving for nurses because nurses do not need to be unnecessary bothered by patients concerning medication				x
Benefits for collaboration				
- improved communication between physicians and nurses/patients, concerning changes in medication schedules	x			
- improved relationship between patients and the health care providing team caused by self-management		x	x	

Table 8. Strengths of self-management of medication

4.5.2.1 Benefits for patients

In general, healthcare providers mostly reported the same benefits as patients. One benefit was the possibility of continuing the medication management routines from home while in hospital. This process allowed patients to take their medication at exactly the same time as they were used to at home. Participants were convinced this approach would also enhance medication adherence:

Well, if I could self-manage my medication during hospitalisation, I can just take my medication as I am used to do so at home, at exactly the same time as I am used to. Patient 3

Because we often see that if we prescribe something we then have feedback from the patient saying 'no, I take that one in the evening'; we obviously know that we give it at another time and that causes resentment, perhaps too strong a word, as the patients do speak to us about it. So that obviously needs to change. If they administer it themselves then they can take it at the same time as they do at home. Physician 3

And they can self-administer medication as they are used to doing, as opposed to the nurse giving it. Then it is at exactly 8 o'clock, while on the ward not so much attention is paid to medication that really should be taken on an empty stomach. Nurse 3

All healthcare providers and patients stated that it would be beneficial for patients to practise their self-management programme during their hospital admission, in a controlled environment. From the perspective of physicians and hospital pharmacists, medication adherence after discharge might improve because of supervision of medication intake and independency training within self management of medication during admission. Both nurses and hospital pharmacists believed education and supervised training while self-managing medication could increase patients' knowledge about medication. Furthermore, nurses stated that patients who already tried to self-manage their medication therapy in hospital could be more confident concerning their medication management before discharge:

. . . as you also have to do at home (self-manage medication); you have to be able to before you can go home. Patient 6

. . . a patient who gets it wrong at home will also get it wrong here. A patient who gets it correct at home will probably also get it correct here. . . . If the patient is doing it wrong, then this is possibly an opportunity to educate the patient by saying, look, you would be better taking that medication in the evening or you would be better taking it twice a day. That is in fact also the time to correct things. Hospital pharmacist 5

I think that for the patient there is certainly an advantage in learning about our medication, certainly if new medication is started in the hospital because afterwards the patient is allowed home and has to self-administer it there as well. Hospital pharmacist 1

Healthcare providers and patients were convinced that patients would feel more autonomous and independent, and patient satisfaction would increase when given the opportunity to self-manage medication. Moreover, patients emphasised the benefit of being in control of their own medication. Patients indicated that full medication management by nurses resulted in constant questioning from patients about when and which types of medication would be administered by nurses. In case of self-management, this approach was not considered a burden, as patients were able to fully control their medication. They felt that they could be sure that they took the right medication at the right time and felt more in control about their health:

. . . the big advantage is that what people could do before, you hand back to them. In fact, this is about independence and autonomy, and respect for that autonomy. Nurse 6

Also, because I have more control. Which they (nurses) give me, because as I have a lot of medication, it causes a lot of difficulties for the nurses, with, what is that now and what is that now. They have trouble understanding it while I know all about it. . . .if I am in charge I know that I have taken them correctly and yes, that gives me peace of mind. Patient 5

. . . the empowerment, or a bit more emphasis given to the knowledge and experience of the patient means that people feel more involved and respected, and this possibly does give better patient satisfaction. Physician 3

Another benefit for patients was suggested by patients, nurses and physicians. They stated that self-management of medication would benefit the safety of patients. Patients recalled events involving not receiving medication or receiving the wrong medication from healthcare providers. Nurses confirmed that some patients had better medication knowledge, compared to nurses. They also emphasised that,

if medication was self-administered, it would be taken on time. An example involved a patient who had to take his Parkinson medication before breakfast:

Yes, medication error. . . . In the morning, I had to ask twice where is my medicine, it is not here. That is why for this second hospitalisation I said, 'I will keep my medicines with me' I won't hand them over, I will take them myself. Patient 3

. . . a lot of studies show that many mistakes in medication administration in hospitals occur because so many steps have to be gone through. . . It may even be that self-management of medication will lead to fewer mistakes than via the hospital, so that is something that needs to be looked at. Physician 3

4.5.2.2 Benefits for nurses

Healthcare providers and patients also perceived the time-saving aspect of self-management as a benefit for nurses. Patients discussed that they did not want to unnecessarily bother nurses concerning medication and therefore believed that self-management would save nurses' time. Healthcare providers indicated that self-management would lead to preparing and administering medication by patients themselves, which would also save time for other nursing tasks:

If I can help the nurses with this so that they have less work, because they are so busy anyway. . . I also try and trouble the nurses as little as possible. Patient 6

. . .if you don't have to prepare all, or at least some of the medication, you have more opportunity to do other things. . . you also see that even if there are fewer patients on your ward. Nurse 3

4.5.2.3 Benefits for collaboration

Lastly, healthcare providers mentioned two benefits concerning collaboration between all stakeholders. Nurses suggested that self-management of medication would result in improved communication between physicians, nurses and patients concerning possible changes in the medication schedule. Hospital pharmacists and physicians also indicated that self-management would result in a better patient– healthcare provider relationship:

Physicians often change medication and we sometimes forget to tell the patient. But if the patient self-administers we are obliged to inform the patient. I think that that is an advantage for both the patient and the nurse. They are informed in the same way, directly from the physician. Nurse 10

I think this (discussion about self-management of medication) opens more possibilities for improving the connection between the patient and the team, not patient and doctor but patient and care team. Physician 2

4.5.3 Weaknesses of self-management of medication

Weaknesses generally differed between healthcare providers and patients. Three main themes emerged from the data: disadvantages for patients, disadvantages for nurses and disadvantages for physicians. Physicians mentioned the most disadvantages (see Table 9).

Weaknesses of self-management of medication	Stated by			
	Nurses	Hospital pharmacists	Physicians	Patients
Disadvantages for patients				
- possible misuse of self-managed medication			x	x
- medication could be stolen and abused by other patients			x	
- risk for medication errors because patients already take medication wrong at home and continue this in self-management whilst in hospital		x		
- risk for medication errors			x	
- not getting the expected outcome of the therapy caused by medication errors			x	
- use of medicines formulary results in less recognisability of medication	x	x		x
- other patients will be able to see the exact amount different medication when preparing				x
- patients will receive both self-managed medication and medication administered by nurses			x	
Disadvantages for nurses				
- providing education results in a more time-consuming intervention compared to preparing medication by nurses	x		x	
Disadvantages for physicians				
- responsible if medication errors occur during self-management			x	

Table 9. Weaknesses of self-management of medication

4.5.3.1 Disadvantages for patients

A disadvantage that physicians and patients agreed on was the possible abuse of self-managed medication. For example, patients that self-managed their medication could take an overdose of painkillers. Physicians also stated that self-managed medication could be stolen and abused by other patients:

... how should I explain, maybe there are patients who take too much medication. I mean painkillers. ... This might lead to an addiction, I would be rather careful. Patient 3

Some types of medication might be very interesting for a specific type of patients. If you share your room with four other patients, and there is a box full of tranquilizers available. . . This might be stolen in some way! Physician 6

Hospital pharmacists and physicians were concerned about the risks of medication errors. In particular, hospital pharmacists stated that patients, who already administered medication incorrectly at home, would continue this practice during self-management of medication in hospital. Physicians stated that there was a risk of medication errors occurring, and there was the possibility of not achieving the expected outcome of therapy because of these medication errors:

Misuse of sleeping tablets, for example, is often a problem (in self-management of medication) and then you no longer have any oversight. Physician 6

As patients needed to take medication from the hospital formulary, patients, nurses and hospital pharmacists questioned whether patients would be able to recognise generic alternatives of their home medications. Generic or brand alternatives might lead to confusion for patients who self-manage their medication:

That also means that the patient doesn't recognise his medication as it normally has a pink hearted shape— something he needs to take for his heart—but now in the hospital it is, for example, no longer a pink pill but a white one. Nurse 9

Another consequence of self-management of medication was mentioned by one patient. When removing medication from the container herself, other patients in the room could observe the exact amount of medication that she needed to take. She perceived the visibility of the act of preparing the medication herself as losing her privacy in hospital:

They (fellow patients) also see that you are taking medication but everything is together in one container. But if you take it yourself . . . then it stands out more. That you are taking several pills or that you get them in a little container. Patient 3

An additional disadvantage as voiced by physicians was the situation involving medications that were partially self-managed by a patient and partially administered by nurses as this change in responsibility could lead to confusion for the patient:

I think that it is also difficult for a patient if he takes his pills from home . . . and then the nurse comes in and she gives another extra container of medication. Physician 6

4.5.3.2 Disadvantages for nurses

Nurses and physicians suggested that providing education during self-management of medication was a time-consuming intervention. Given the current working environment, nurses already lacked time during their shifts:

The greatest disadvantage for care givers is that if the patient still has to be taught (to self-administer medication), it takes more time. Nurse 7

In order to work patient centred, we need to have some resources to deliver this quality. At this moment, we are confronted with staff cut backs. We got the feeling we cannot deliver the quality we would like to. Nurse 6

4.5.3.3 Disadvantages for physicians

Also for physicians, one specific disadvantage was discussed. It was perceived that physicians would feel personally responsible, if medication errors occurred during self-management of medication.

4.5.4 Opportunities for self-management of medication

Many opportunities were discussed during the interviews (see Table 10). Because of their diversity, they were subdivided into opportunities related to the organisation, the patient and implementation.

Opportunities for self-management of medication	Stated by			
	Nurses	Hospital pharmacists	Physicians	Patients
Opportunities related to the organisation				
- lockers are already available at the patient's room	x		x	x
- possibility to take medication everywhere in the hospital				x
- a clear overview of self-managed medication and medication administered by nurses	x			
- unit dose medication is provided at the hospital pharmacy		x		
- delivery of self-managed medication can be the same as medication administered by nurses		x		
Opportunities related to the patient				
- intrinsically motivated patients for self-management of medication	x			
- patients sometimes know their medication better in comparison with the nurse or treating physician	x	x		x
Opportunities related to the implementation				
- self-management of medication does already occur at their ward	x	x		x
- a team of nurses who are willing to allow/implement self-management of medication	x			
- when self-administering medication health care providers already monitor medication intake				x
- education before discharge is already provided		x		x
- pharmacists assistants are possibly available to provide education				x

Table 10. Opportunities for self-management of medication

4.5.4.1 Opportunities related to the organisation

An opportunity considered by patients, nurses and physicians was that bedside lockers were already available in the patient's room. As such, medications could easily be locked up. This is, however, not the case in all hospitals. Patients also mentioned that it was possible to take medication in almost every room of the hospital. In addition, patients could retrieve water or coffee in their room and in every corridor. This retrieval would facilitate the intake of self-managed medication:

As far as I know in every patient room there are lockers . . . why shouldn't you keep medication in there?
Physician 1

If it is urgent (taking medication) then I take them with me. I can always get a glass of water here.
Patient 1

Some nurses stated that they did have a well-designed software application for medication self-management. This software provided a clear overview of self-managed medication and medication administered by nurses. This is, however, not the case in all hospitals. Another opportunity for self-management was the possible provision of unit dose medication at the hospital pharmacy. Hospital pharmacists also confirmed that the current logistic process for medication distribution could be used for patients that self-managed their medication:

It is very noticeable (self-managed medication), it is obvious for anyone to see, it is a big red cross.
Nurse 1

That they (pharmaceutical companies) provide packaging that is all in dosage units. . . . A number of companies already do this, but not all. Hospital pharmacist 6

4.5.4.2 Opportunities related to the patient

Two specific opportunities for self-management of medication were related to the patient. Nurses mentioned the presence of intrinsically motivated patients for self-management of medication. These patients already asked about the possibility to self-manage their medication. Patients, nurses and hospital pharmacists agreed that patients sometimes had better medication knowledge, compared to the nurse or the treating physician:

For medication that the patient already knows and which the patient is in fact taking at home when he is admitted here for another operation or disease, then I can see advantages for the nursing staff of self-management of that medication. In that sense, the patient often knows all his (self-managed) medication better than the nurses or the treating physician, because it often involves something completely different to the disease for which he is being treated. Hospital pharmacist 1

4.5.4.3 Opportunities related to the implementation

Lastly, some opportunities directly related to the implementation of self-management of medication. Nurses, hospital pharmacists and patients emphasised that self-management of medication was actually being conducted on some wards. Moreover, some nurses stated that their team was already willing to allow and implement self-management of medication:

Yes, they always give a good explanation about how you should do it (self-injection of insulin during hospitalisation). Patient 6

Patients mentioned that when they self-managed their medication, healthcare providers already monitored their medication intake. Patients and hospital pharmacists also emphasised that education before discharge was already provided. One patient referred to the pharmacy assistants as an opportunity for providing education concerning medication, as they were present at the hospital pharmacy:

So that (education) is, naturally, now partly done by the nurse, even if it is not self-managed it is nevertheless stated how I should take it and when and how after discharge from hospital. Hospital pharmacist 2

She (pharmacy assistant) can also explain about (self-management of medication) before meals, after meals, yes that sort of thing. Patient 3

4.5.5 Threats for self-management of medication

Some threats for self-management of medication were expressed by healthcare providers. These threats concerned obstacles related to the implementation of self-managed medication and obstacles concerning the medication itself. In comparison with nurses, who stated many threats, hospital pharmacists and physicians stated fewer threats (see Table 11).

Threats for self-management of medication	Stated by			
	Nurses	Hospital pharmacists	Physicians	Patients
Obstacles related to the implementation				
- absence of a clearly defined legal context in which responsibilities were determined	x	x	x	
- assessing the patients' competences in order to self-administer			x	
- changes in medication management routines and habits at the hospital	x		x	
- current work environment and the limited time for both nurses and hospital pharmacists to educate patients	x	x		
Obstacles concerning medication				
- medication has to be provided from the present formulary	x	x		
- the delivery of medication at the right time	x	x		
- changes in this medication schedule caused by medical examinations during hospitalisation	x		x	
- a continuously changing or non-stable medication schedule	x			
- a medication schedule with fragile medication or high risk medication	x			
- the lack of medication program who allows to tick of one medicine at a time	x			
- the lack of medication program who allows to show an overview of the medication schedule for the hospital pharmacist and other health care providers	x	x		
- the lack of a locker to safely hide the medication itself	x			

Table 11. Threats for self-management of medication

4.5.5.1 Obstacles related to the implementation

Four obstacles were identified relating to the implementation of self-management of medication. A much-debated obstacle during the interviews, and one about which all healthcare providers were unanimous about, was the absence of a clearly defined legal context in which responsibilities were determined. In addition, physicians also stated the challenge of how to decide who was able to self-manage. A structured way of approaching this “selection” of patients of who were able to self-manage their medication was lacking:

Surely it is important that everyone knows who is responsible and for what, and to what degree? And if the hospital pharmacist is involved . . . then procedures have to be established . . . a decision tree with which the patient has to comply, if it happens under these conditions it can be done. Hospital pharmacist 2

Another obstacle concerned nurses' and physicians' worries about the adoption of other ways of approaching medication management. Changing the current fixed routine of medication management in hospital might be challenging. Moreover, nurses and hospital pharmacists perceived the current work environment and limited time as obstacles for educating patients during self-management of their medication:

It is of course a completely different attitude and approach by care workers and will require another approach, another way of thinking. On one side, it will be time-saving for the nursing staff, on the other, they will have to give other information because something like this is different and it needs to be looked at differently. Physician 3

4.5.5.2 Obstacles concerning medication

Other important threats for self-management of medication were some obstacles related to medication. During hospitalisation, it was mandatory that medication was delivered by the hospital pharmacy; therefore, patients would receive medication from the present medicines formulary of that specific hospital. It was also a well-known problem in hospital pharmacies to make sure that medication arrived on time on the wards. Hence, problems on stock shortages or rare medications were common:

We work with the pharmacy which is not so efficient here . . . the medication arrives here but it is not always on time. Nurse 5

Other perceived obstacles related to the medication schedule. Many nurses stated that changes in the medication schedule could cause problems. These changes could be caused by medical examinations that implied adaptations in the medication schedule due to, for example, fasting before having surgery. Otherwise, changes could be linked to nonstable medication schedules, for example, patients on warfarin. Furthermore, nurses were worried about self-management of fragile or high-risk medication, for example, medication for kidney transplant patients:

If a patient with acute heart failure deteriorates, his medication will be adjusted. The type of medication might also change during hospitalisation. If so, I think he cannot self-manage as long as his medication schedule is unstable. Nurse 7

Medication for kidney patients is so delicate, so precise that they (care team) want to have it all in their own hands. We will rarely be able to put a red star next to a kidney patient [mark of self-management of medication]. Nurse 1

Practically, there was a lack of a well-designed software application for self-management of medication. Healthcare providers believed this software would enable caregivers to tick off one self-managed medication at a time, thereby providing a clear overview on which medication was self-managed and which was managed by nurses. Also, it was perceived that this overview should be available for all nurses, physicians and hospital pharmacists involved in the patients' care.

In the end, not every hospital had lockers in their patient rooms in order to be able to lock away self-managed medication. Therefore, in some cases, this was an obstacle for self-management of medication:

Our electronic patient file also doesn't lend itself to indicating: what is electronic, under individual control? We could put home medication completely under the individual's control but then you can't directly see what that patient is taking. Nurse 7

4.5.6 Conditions for allowing self-management of medication

Healthcare providers and patients mentioned important conditions for allowing self-management of medication. Hence, question 5 was added after the first three interviews (see Box 1). As shown in Table 12, these conditions were subdivided into conditions related to the patient, the medication and the organisation.

Conditions for allowing self-management of medication	Stated by			
	Nurses	Hospital pharmacists	Physicians	Patients
Conditions related to the patient				
- patient already self-managed medication at home/before admission	x	x	x	
- patient will self-manage medication after discharge	x			
- patient is willing to self-manage medication whilst in hospital	x			
- patient is willing to take his responsibility during self-management			x	
- patient's mental and physical condition is adequate	x	x	x	x
- patient needs to have knowledge about the self-managed medication			x	
Conditions related to the medication				
- patient needs to take low risk medication			x	
- patient does not take too many different types of medication			x	
- patient cannot self-administer intravenous, intramuscular or subcutaneous medication	x			
Conditions related to the organisation of self-management of medication				
- presence of a clear legal context with defined responsibilities in case of self-management of medication	x	x	x	
- an overview of both self-managed medication as medication administered by nurses for every health care provider	x	x	x	
- a medication review of both self-managed medication as medication administered by nurses	x	x	x	
- a monitoring system for the medication intake of patients self-administering	x	x	x	x
- ability to lock away self-managed medication	x	x	x	x
- an agreement concerning self-managed medication logistics e.g. supply of stock at the patient room, correct preservation and labelling of medication	x	x	x	
- if the medication schedule has been changed, health care providers and patients have to be notified	x			

Table 12. Conditions for allowing self-management of medication

4.5.6.1 Conditions related to the patient

The anticipated conditions that patients had to meet were very clear; the patient had to be self-managing at home before and after hospitalisation, had to be willing to self-manage medication while in hospital and had to be able—mentally and physically—to self-manage medication. In addition to these conditions, patients had to take their part of the responsibility, and they should have knowledge on the self-managed medication. Not only did patients' characteristics have to be evaluated, but also the type, the amount of different medication and the administration route of the medication had to be identified.

4.5.6.2 Conditions related to the medication

Physicians and nurses cited some prerequisite requirements that medication had to meet. Self-managed medication had to be low-risk medication, patients should not self-manage too many different types of medication, and patients could not self-manage medication which had to be administered intravenously, intramuscularly or subcutaneously.

4.5.6.3 Conditions related to the organisation

Moreover, specific conditions were described that had to be met by the organisation in order to self-manage medication. These conditions involved a clear legal context with defined responsibilities in

case of self-management, a well-designed software application for self-management which included an overview of both self-managed medication and medication administered by nurses. Furthermore, a medication review could be performed on both self-managed medications and medications administered by nurses. Also, both healthcare providers and patients preferred a system to monitor medication self-management and lockers to safely hide away self-managed medication.

Healthcare providers agreed the logistic process concerning self-management had to be clear and had to be considered in discussions with all stakeholders. It had to be clear where to store self-managed medication in the patients' room, how to preserve certain medication and how to label medication correctly. Furthermore, healthcare providers and patients needed to be notified if any changes occurred in the self-managed medication schedule.

4.6 Discussion

4.6.1 Main findings

This study identified comprehensively the strengths, weaknesses, opportunities and threats of self-management of medication in hospital (see Table 13). Overall, it is possible to conclude that self-management of medication was found to be very beneficial especially for patients and for nurses, and the process facilitated collaboration between all stakeholders. Most strengths were previously described in a qualitative patients' perspective study and in a systematic review (Manias, Beanland, Riley, & Baker, 2004; Richardson et al., 2014). The benefits for patients being able to practise medication intake and management— resulting in an increased patient confidence before discharge and an improved therapeutic adherence after discharge—were also described in a study concerning the supporting measures by the healthcare team in kidney transplant patients (Williams, Low, Manias, & Crawford, 2016). Weaknesses of self-management of medication concerned disadvantages for patients, nurses and physicians. While aspects of these results have been previously described, insights from physicians on this topic have been lacking until now (Richardson et al., 2014; Williams et al., 2016). Self-management of medication created possible tensions between enabling patients to self-manage medication— resulting in several benefits—and the possible misuse of medication or increased incidence of medication errors. At this moment, a small body of evidence suggests that self-management of medication would result in reduced medication errors (Richardson et al., 2014). In addition, participants indicated that patients might know their own medication better compared to nurses or the treating physician on the ward. This increased knowledge might be related to the benefit of creating a safer medication management. The opportunities described in this study were not previously explored. They reveal the differences in implementing self-management of medication in different hospitals, as some hospitals had lockers in the patients' room and some hospitals did not. Also, some hospitals did have a medication management programme, which was suitable for self-management, while others did not. This variation resulted in some items that were being described as obstacles, if they were absent or inadequate or opportunities if available. The threats of self-management concerned overall threats, such as the lack of a clearly defined context and an assessment to define the appropriateness of patients, the changes in routines and habits and the limited time within the current work environment, were similar to the threats described in the literature (Manias et al., 2004; Richardson et al., 2014). Further interpretation of the study results, and specifically the effect of self-management on time management, indicated that some aspects of self-management (e.g., providing education) will result in a time-consuming intervention, while others (e.g., less preparation of medication by nurses) will result in a time-saving effect. A study on the effect of self-management on staff satisfaction identified that they believed self-management of medication would be time-consuming and increase work stress. Other studies indicated that self-management increased time spent on medication management and patient education. Nevertheless, also reports from a

reduction in time spent on medication administration by nurses were found. These diverse findings suggest that further research should focus on the impact of self-management on time management for every stakeholder (Richardson et al., 2014).

Strengths of self-management of medication
<ul style="list-style-type: none"> • Benefits for patients • Benefits for nurses • Benefits for collaboration
Weaknesses of self-management of medication
<ul style="list-style-type: none"> • Disadvantages for patients • Disadvantages for nurses • Disadvantages for physicians
Opportunities for self-management of medication
<ul style="list-style-type: none"> • Opportunities related to the organisation • Opportunities related to the patient • Opportunities related to the implementation
Threats for self-management of medication
<ul style="list-style-type: none"> • Obstacles related to the implementation • Obstacles concerning medication

Table 13. Themes and subthemes of the SWOT-analysis

4.6.2 Implications for practice—process changes advised for implementing self-management of medication

The findings of this study result in potentially important implications for practice. They provided comprehensive insights on the viewpoints of all relevant stakeholders concerning self-management of medication. Findings also indicated that some aspects for implementing self-management of medication are lacking. For example, there is the need for a protocol or procedure including tailor-made agreements on medication logistic for every hospital or ward when self-managing medication. Also, a protocol or procedure would create clarity on how to assess the competences of the eligible patient population, how medication delivery will take place, the management of self-managed high-risk medication, and how to monitor medication intake. This policy should consist of a procedure on self-management of medication during hospitalisation; an assessment to decide whether patients are able to self-manage their medication; a monitoring tool for medication intake during self-management of their medication and support both for patients and for involved caregivers. A clear social and legal context should be provided to facilitate self-management of medication and to facilitate smooth promotion of the self-management of medication process.

Overall, the results of this study gave new insights on the actual implementation of self-management. Therefore, the research team explored the feasibility of self-management of medication. The medication management process as described by the Nursing and Midwifery Council and the nursing medication processes as described by Dilles et al. were used as guides to describe adaptations in the medication management process to enable implementation of self-management of medication (Dilles, Elseviers, Van Rompaey, Van Bortel, & Stichele, 2011; Nursing and Midwifery Council, 2007). A flow chart was created including advised process changes for implementing self-management of medication (see Figure 5).

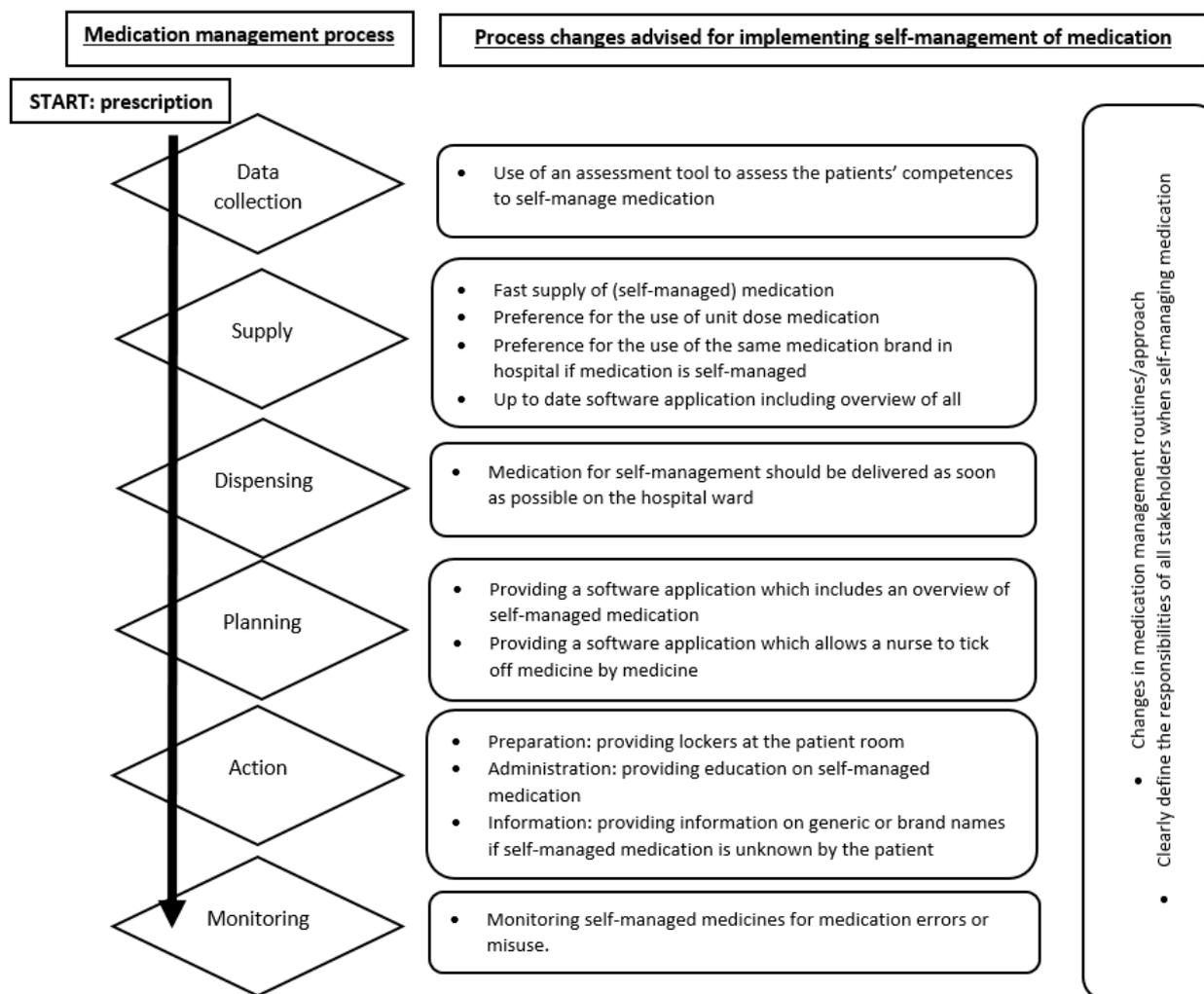


Figure 5. Advised changes in the medication management process for implementing self-management of medication.

The medication management process starts with a prescription for medication. During the *first* step, nurses collect data on the patients' competences to self-manage their medication. To evaluate these competences, an assessment is needed. During interviews, healthcare providers and patients comprehensively provided their opinions on the type of patients and specific conditions that had to be met before allowing self-administration of medication. The conditions that were related to the patient were also described in the qualitative study by Manias et al. and were included in the Self-Administration of Medication (SAM) tool, which was validated by these authors (Anderson, Manias, Kusljic, & Finch, 2014; Manias et al., 2004).

During the *second* step, if a screening tool indicates that a patient is competent for self-management, these medication needs to be supplied. Hospital pharmacists articulated that medication shortages in hospital pharmacies were a barrier for this supply. These shortages were not directly related to self-management, although they had a considerable influence on medication management. Participants described the use of home medicines brought into hospital by patients in order to be able to continue the patients' therapy in hospital. This issue has been extensively described in a survey by the European Association of Hospital Pharmacists (EAHP) in 2014 (Preece & Price, 2014). Self-managed medication should be supplied in unit dose; hence, cutting each medicine out of a medication blister strip results in medication which cannot be recognised or identified by the patient, nor can expiration dates or lot

numbers be retrieved. Furthermore, hospital pharmacies supply medication as recommended by their formulary; hence, it might be difficult for patients to recognize generic and brand names. It would be ideal to supply medication which is known by the patient; nevertheless, it is not possible to prescribe outside the formulary. Also, the software application of the hospital should provide an overview of self-managed and medication managed by nurses. This software should be able to show healthcare providers an up-to-date medication chart at all time.

The *third* step, dispensing medication, might have been influenced by stock shortages or rare medications that were difficult to obtain. It is desirable that (self-managed) medication is delivered directly on the hospital ward.

The abovementioned three steps indicate that hospital pharmacies and their current logistic process of preparing, supplying and dispensing medication might need some adaptation.

In the next phase of the medication management process, during the *fourth* step, planning the action of medication (self)-management is essential. If a patient is allowed to self-manage medication, a well-designed software application was deemed necessary. This software should provide nurses with an overview of self-managed medicines and the possibility to tick off medicine by medicine if they had been taken for consumption.

During the *fifth* step, the actual action of self-management of medication starts. This medication needs to be stored in a safe manner; therefore, it is recommended that lockers should be provided in the patient room. Additionally, the administration of self-managed medication implies supporting and informing patients by providing education on self-managed medication. This might also overcome problems when patients need to take generic or brand medication that they did not recognise. A systematic review on existing self-management programmes indicated that most of the programmes already provide an educational aspect (Richardson et al., 2014). While patients self-manage their medication, monitoring (e.g., type of medicine taken, number of medicines taken, medication errors) is essential. A review on the literature of studies on patient self-management measured outcomes such as medication errors or patient compliance; most of these studies used pill counts and patient self-reported compliance (Richardson et al., 2014).

During the entire process of self-management of medication, self-management will result in changes in medication management routines which have to be managed. Nurses will, instead of preparing and administering medication, assess patients' competence or appropriateness concerning self-management of medication, support and provide education concerning medication and evaluate the possibility of self-management of medication during the entire hospital stay. Also, the responsibilities of every stakeholder should be clearly defined. In Belgian hospitals, it is legally possible to allow self-management. If implemented, this has to be noted in the patients' personal medical file and it has to be clearly described which medication the patient self-manages and which are administered by nurses. During hospitalisation, healthcare providers have a "duty of care" and a "duty of surveillance." If problems concerning medication arise, these have to be noted in the patients' personal medical file. The treating physician is then held responsible (Care inspection of the Flemish division of Wellbeing, Public Health and Family, personal communication, October 2015).

Self-management of medication should be a multidisciplinary intervention. The importance of this approach has already been described as an important factor to achieve improved patient safety (Adhikari, Tocher, Smith, Corcoran, & MacArthur, 2014). Given the strengths, weaknesses, opportunities and threats stated by nurses, it is possible to conclude that nurses play a key role within this multidisciplinary approach (Adhikari et al., 2014).

Before implementing this specific medication management process for self-management of medication in daily practice, additional research is recommended. The validity and feasibility for the use in clinical practice should be tested. Afterwards, in an interventional study, the effect of the adjusted process of self-management of medication on outcome parameters (e.g., time management, medication administration errors) could be tested. Next to the process of self-management, additional tools should be developed and tested. This concerns, for example, a screening tool to screen patients' abilities or competences to self-manage medication in hospital, a tool to monitor the patients' medication intake and supportive tools to support patients while self-managing medication.

4.6.3 Strengths and limitations

The key strength of the study was the inclusion of the perception of all stakeholders comprising nurses, physicians, hospital pharmacists and patients who were situated in three different hospitals. A limitation of the study was the short duration of patient interviews, compared to the interviews with healthcare providers. It is possible that, as self-management of medication is not actively followed in hospital settings, the process of patients reflecting on the topic of self-management of medication might be difficult. Not all patients in this study did self-manage their medication. Additional studies might focus on the perspectives of patients that structurally self-manage their medication in hospital, and should include a larger sample, with both male and female participants. The views expressed in this study may have reflected on the fact that individuals who participated were interested and in favour of the practice of self-management of medication compared with those who did not participate.

4.7 Conclusions

This study provides unique insights on the possible strengths, weaknesses, opportunities and threats for self-management concerning four important stakeholders: patients, nurses, hospital pharmacists and physicians. Strengths of self-management were mostly perceived as benefits for patients and nurses, and benefits for collaboration between stakeholders. Weaknesses concerned possible disadvantages for patients, nurses and physicians. Opportunities for self-management were mostly related to the organisation, the patients itself and some factors for facilitating the implementation. Nevertheless, some factors impede implementation; also, some obstacles concerning medication were described as threats for self-management. After interpreting the study findings, adaptations in the medication management process were described. This newly described process provides the basics to start implementing self-management of medication in daily practice. Further research to validate and test the process, and to develop practical additional tools, is recommended.

4.8 Acknowledgements

Research for this work was financially supported by the Thomas More University College.

4.9 Contributions

Study design: TV, KB, TD; data collection and analysis: TV, EM, MP, TD; and manuscript preparation: TV, KB, EM, MP, TD, JF.

4.10 ORCID

Toke Vanwesemael <http://orcid.org/0000-0003-3030-4024>

4.11 References

- Adhikari, R., Tocher, J., Smith, P., Corcoran, J., & MacArthur, J. (2014). A multi-disciplinary approach to medication safety and the implication for nursing education and practice. *Nurse Education Today*, 34(2), 185–190. <https://doi.org/10.1016/j.nedt.2013.10.008>
- Anderson, J., Manias, E., Kusljic, S., & Finch, S. (2014). Testing the validity, reliability and utility of the Self-Administration of Medication (SAM) tool in patients undergoing rehabilitation. *Research in Social and Administrative Pharmacy*, 10(1), 204–216. <https://doi.org/10.1016/j.sapharm.2013.04.013>
- Barlow, J., Wright, C., Sheasby, J., Turner, A., & Hainsworth, J. (2002). Self-management approaches for people with chronic conditions: A review. *Patient Education and Counselling*, 48(2), 177–187. [https://doi.org/doi:10.1016/S0738-3991\(02\)00032-0](https://doi.org/doi:10.1016/S0738-3991(02)00032-0)
- Barnason, S., Zimmerman, L., Hertzog, M., & Schulz, P. (2010). Pilot testing of a medication self management transition intervention for heart failure patients. *Western Journal of Nursing Research*, 32(7), 849–870. <https://doi.org/10.1177/0193945910371216>
- Dilles, T., Elseviers, M. M., Van Rompaey, B., Van Bortel, L. M., & Stichele, R. R. (2011). Barriers for nurses to safe medication management in nursing homes. *Journal of Nursing Scholarship*, 43(2), 171–180. <https://doi.org/10.1111/j.1547-5069.2011.01386.x>
- Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277–1288. <https://doi.org/10.1177/1049732305276687>
- Huber, M., Knottnerus, J. A., Green, L., Horst, H. V. D., Jadad, A. R., Kromhout, D., Smid, H. (2011). How should we define health? *British Medical Journal*, 343, d4163. <https://doi.org/10.1136/bmj.d4163>
- Keers, R. N., Williams, S. D., Cooke, J., & Ashcroft, D. M. (2013a). Causes of medication administration errors in hospitals: A systematic review of quantitative and qualitative evidence. *Drug Safety*, 36(11), 1045–1067. <https://doi.org/10.1007/s40264-013-0090-2>
- Keers, R. N., Williams, S. D., Cooke, J., & Ashcroft, D. M. (2013b). Prevalence and nature of medication administration errors in health care settings: A systematic review of direct observational evidence. *Annals of Pharmacotherapy*, 47(2), 237–256. <https://doi.org/10.1345/aph.1R147>
- London Audit Commission (2001). *A spoonful of sugar: Medicines management in NHS hospitals*. London, UK: London Audit Commission.
- Manias, E., Beanland, C., Riley, R., & Baker, L. (2004). Self-administration of medication in hospital: Patients' perspectives. *Journal of Advanced Nursing*, 46(2), 194–203. <https://doi.org/10.1111/j.1365-2648.2003.02979.x>
- McLeod, M., Ahmed, Z., Barber, N., & Franklin, B. D. (2014). A national survey of inpatient medication systems in English NHS hospitals. *BMC Health Services Research*, 14, 93. <https://doi.org/10.1186/1472-6963-14-93>
- Meleis, A. I. (2012). *Theoretical nursing: Development and progress*. Philadelphia, PA: Wolters Kluwer Health/Lippincott Williams & Wilkins.
- Nursing and Midwifery Council (2007). *Standards for medicines management*. London: NMC.
- Orem, D. E. (2001). *Nursing: Concepts of practice*. St. Louis, MO: Mosby.
- Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health and Mental Health*, 42(5), 533–544. <https://doi.org/10.1007/s10488-013-0528-y>

- Palmer, R., Finnegan, T., & Darko, A. (2014). Guidelines for Patient Self- Administration of Medication (SAM). Retrieved from <http://studylib.net/doc/8439031/patient-self-administration-of-medicine-sam>
- Parnell, M. A. (1959). Medicines at the bedside. *American Journal of Nursing*, 59, 1417–1418.
- Patton, M. Q. (2002). *Qualitative research and evaluation methods*. Thousand Oaks, CA: Sage Publications.
- Preece, D., & Price, R. (2014). PS-076 The problem of medicines shortages in hospitals across Europe: The European Association of Hospital Pharmacists (EAHP) Survey. *European Journal of Hospital Pharmacy: Science and Practice*, 21(Suppl 1), A174–A175. <https://doi.org/10.1136/ejhpharm-2013-000436.427>
- Richardson, S. J., Brooks, H. L., Bramley, G., & Coleman, J. J. (2014). Evaluating the effectiveness of self-administration of medication (SAM) schemes in the hospital setting: A systematic review of the literature. *PLoS ONE*, 9(12), e113912. <https://doi.org/10.1371/journal.pone.0113912>
- Sandelowski, M. (2000). Whatever happened to qualitative description? *Research in Nursing & Health*, 23(4), 337.
- Tran, T., Elliott, R. A., Taylor, S. E., & Woodward, M. C. (2011). A self-administration of medications program to identify and address potential barriers to adherence in elderly patients (January). *Annals of Pharmacotherapy*, 45(2), 201–206. <https://doi.org/10.1345/aph.1P473>
- Trappenburg, J., Jonkman, N., Jaarsma, T., van Os-Medendorp, H., Kort, H., de Wit, N., Schuurmans, M. (2013). Self-management: Onesize does not fit all. *Patient Education and Counselling*, 92(1), 134– 137. <https://doi.org/10.1016/j.pec.2013.02.009>
- Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing & Health Sciences*, 15(3), 398–405. <https://doi.org/10.1111/nhs.12048>
- Vanwesemael, T., Van Rompaey, B., Petrovic, M., Boussery, K., & Dilles, T. (2017). SelfMED: Self-administration of medication in hospital: A prevalence study in Flanders, Belgium. *Journal of Nursing Scholarship*, 49(3), 277–285. <https://doi.org/10.1111/jnu.12290>
- WHO (2016). Framework on integrated people-centred health services. Retrieved from New York <http://www.who.int/servicedeliverysafety/areas/people-centred-care/fullframe.pdf?ua=1>
- Williams, A., Low, J. K., Manias, E., & Crawford, K. (2016). The transplant team’s support of kidney transplant recipients to take their prescribed medications: A collective responsibility. *Journal of Clinical Nursing*, 25(15–16), 2251–2261. <https://doi.org/10.1111/jocn.13267>
- Wright, J., Emerson, A., Stephens, M., & Lennan, E. (2006). Hospital inpatient self-administration of medicine programmes: A critical literature review. *Pharmacy World & Science*, 28(3), 140–151. <https://doi.org/10.1007/s11096-006-9014-x>



Chapter 5

The willingness and attitude of patients towards self-administration of medication in hospital

Outline

5	The willingness and attitude of patients towards self-administration of medication in hospital	75
5.1	Abstract	75
5.2	Introduction	76
5.3	Methods	77
5.3.1	Design	77
5.3.2	Participants	77
5.3.3	Data collection	77
5.3.4	Study outcomes	78
5.3.5	Ethical considerations	78
5.3.6	Data analysis	78
5.4	Results	79
5.4.1	Population	79
5.4.2	Patients' willingness and attitude towards self-administration of medication in hospital	79
5.4.3	Association between patient characteristics and their willingness to self-administer medication	82
5.4.4	Patients' ability to self-administer medication in hospital	82
5.4.5	Prerequisites for self-administration of medication	83
5.4.6	Perceived consequences of self-administration of medication	84
5.5	Discussion	85
5.5.1	Main findings: willingness and attitude towards self-administration of medication	85
5.5.2	Secondary outcomes	86
5.5.3	Implications for practice	88
5.5.4	Strengths and limitations	89
5.6	Conclusion	89
5.7	Authors' note	89
5.8	Funding	89
5.9	Conflict of interest statement	89
5.10	References	90

5 The willingness and attitude of patients towards self-administration of medication in hospital

This chapter has been published as:

Vanwesemael, T., Boussey, K., van den Bemt, P., & Dilles, T. (2018). The willingness and attitude of patients towards self-administration of medication in hospital. Therapeutic Advances in Drug Safety, 9(6), 309-321. doi:10.1177/2042098618764536

5.1 Abstract

Background

Literature suggests a positive impact of self-administration of medication during hospitalization on medication adherence and safety, and on patient satisfaction. However, self-administration is not a common practice in Belgian hospitals. The aim of this study was to describe patients' willingness towards self-administration of medication while in hospital.

Methods

A cross-sectional observational study was conducted in three Belgian hospitals in November and December 2015. All patients of 14 randomly selected wards were asked to participate. The structured questionnaire comprised patient characteristics, their willingness and attitude towards self-administration of medication, perceived ability to self-administer during hospitalization, and prerequisites and perceived consequences.

Results

In total, 124 patients participated (36% of all eligible patients). The main reasons not to participate were the patients' physical and mental condition (30%) and the absence of patients during the time of data collection (23%). The majority of the 124 participating patients had a positive attitude towards the implementation of self-administration; 83.9% were willing to self-administer their medication while in hospital. Most important prerequisites were self-administration at home before and after hospitalization, patients' motivation, and a regular evaluation of the patients' competences. Patients acknowledged benefits such as an increase in autonomy, independence and medication knowledge. Patients did not expect self-administration would cause important safety issues.

Conclusion

The majority of patients, capable of participating in the study, would want to self-administer medication during hospitalization. They had a positive attitude towards self-administration of medication. Nevertheless, patients stated important conditions which need to be considered in order to implement self-administration.

Keywords

attitudes, hospital, nursing, patient, perspectives, SAM, self-administration of medication

5.2 Introduction

Administration of medication in acute care settings is traditionally a nursing responsibility. Nevertheless, self-administration of medication by patients during their hospitalization has been reported in literature since 1959.¹ It relates to the process in which patients prepare and consume medications themselves rather than a health professional taking on this role.

There are two systematic reviews on self-administration of medication by hospitalized patients that describe the structure and implementation of several self-administration of medication schemes and self-administration of medication programmes.^{2,3} Studies on self-administration described advantages compared with administration of medication by nurses, such as an increased patient satisfaction and an improvement of adherence to pharmacotherapy and self-care competence.²⁻⁴

The prevalence of self-administration has not been studied extensively. A Flemish prevalence study indicated 22% in a total population of 1269 hospitalized patients self-administered at least one medication during their hospitalization. According to the opinion of the head nurses in this study, almost twice this number of hospitalized patients would have been able to self-administer their medication during hospitalization (41%). The decision-making process of allowing self-administration was mostly shared between the treating physician, the nurse, and the patient. Therefore, requiring an engagement of every stakeholder. Although, hospital pharmacists were not involved in the decision-making process, they remain responsible for medication provision in hospitals and should be involved in self-administration of medication.^{5,6} A study by McLeod and colleagues which took place in English National Health Service (NHS) hospitals showed the majority of surgical and medical wards (93%) did have a patient self-administration policy.⁷

In implementing self-administration of medication, the patients' attitude, as a key stakeholder, is essential. Studies on the opinion or attitudes of patients towards self-administration of medication are however scarce. A study by Deeks and Byatt showed self-administering patients had a significantly better overall impression of care, and were significantly more willing to self-administer medication if hospitalized again.⁴ In a qualitative study by Manias and colleagues patients described benefits of self-administration, such as: increased patient control, it allows respect for patient knowledge, it encourages a more sharing nurse-patient relationship, and it helps to reinforce the patients' knowledge about medication.⁸ Another qualitative descriptive research⁸ on healthcare providers' and patients' perspectives on self-administration of medication during the patients' hospital stay identified some important perspectives concerning patients. Participants were convinced self-administration would lead to more satisfied patients, who feel more autonomous and independent. Moreover, patients indicated the benefit of being in control of their own medication, they would not have to disturb nurses in order to question them concerning when and which type of medication would be administered. Patients suggested this approach would result in safer medication management. Although, patients were very positive, they also acknowledged the possibility of medication being abused or stolen by other patients. Also, a possible challenge could be the use of medication from the hospital formulary, resulting in difficulties recognizing generic or brand alternatives.⁹

To increase levels of implementation, patients' attitude towards self-administration of medication in hospital has to be known, acknowledged, and taken into account in change management. The presence of qualitative studies concerning this topic allowed the research team to develop a questionnaire. This made it possible to investigate the willingness and attitude of a larger sample of patients.

This study aimed to describe the willingness of Flemish hospitalized patients to self-administer medication and their attitude towards it. Secondary, this study aimed to describe the association of

several factors with the willingness to self-administer medication, and to describe the ability of patients to self-administer as well as prerequisites and perceived consequences of self-administration. These results will be taken into account when developing a self-administration of medication policy in Belgian hospitals.

5.3 Methods

5.3.1 Design

An observational cross-sectional study was conducted in three Belgian hospitals. Hospitalized patients were questioned in a structured interview on their willingness and attitude towards self-administration of medication.

5.3.2 Participants

In each of two university hospitals and one general hospital, five different wards were randomly selected and invited to participate. The following wards were excluded because of their specific medication management process: pediatrics, emergency departments, intensive care units, operating theatres, and day hospitals. One ward refused to participate due to time restraints. All hospitalized patients, on the day of data collection (n = 342) on these wards were first screened in consultation with the head nurse. Patients were excluded if they were deemed to be too ill to participate, not present on the ward at the time of data collection, not able to speak Dutch, or aged younger than 18 years. The remaining patients were informed about the study and asked to sign informed consent in case of participation (see Table 14).

	n	%
Hospitalized patients on included wards	342	100.0
Step 1: Screening in consultation with head nurse		
Excluded because of:		
Too ill to participate	100	29.3
Not present during study	78	22.8
Not able to speak Dutch	17	5.0
Step 2: Providing oral and written informed consent for patients		
Refused to participate	23	6.7
Participating patients in the study	124	36.3
Hospitalized on:		
Surgical ward	64	51.6
Medical ward	53	42.7
Geriatric ward	4	3.2
Rehabilitation ward	3	2.4

Table 14. Flowchart of participants in the study

5.3.3 Data collection

A self-developed structured questionnaire was used. Firstly, patients were questioned about their characteristics (demographic data and routines of managing chronic medication at home). Secondly, they were questioned about their ability to self-administer medication in hospital. This concerned their own opinion on their ability to self-administer. If they already took chronic medication at home, it concerned the ability to self-administer these medications during hospitalization. If they did not take any chronic medication, it concerned their ability to self-administer medication they got during that particular hospital stay. Thirdly, their attitude towards self-administration of medication in hospital

was questioned by a set of five questions. They could be answered with the use of a four-point Likert scale: strongly disagree, disagree, agree, and strongly agree. Fourthly, one explicit question on the patients' opinion on being keen to self-administer questioned their actual willingness to self-administer with the use of a six-point Likert scale; absolutely not willing, not willing, rather not willing, rather willing, willing, absolutely willing. In the end, their opinion on prerequisites and consequences of self-administration of medication in hospital were assessed (see Table 15 for the structure of the questionnaire and Table 17, Figures 8 and 9 for the items).

Structured patient questionnaire	n of questions
1. Patient characteristics	
a. Demographic data	7
b. Medication management chronic medication	2
2. Ability to self-administer medication in hospital	1
3. Attitude towards self-administration of medication in hospital	5 ^a
4. Willingness to self-administer medication in hospital	1 ^b
5. Opinion on prerequisites for self-administration of medication	8 ^a
6. Opinion on consequences of self-administration of medication	7 ^a

^a 4 point Likert scale: strongly disagree-disagree-agree-strongly agree
^b 6 point Likert scale: absolutely not willing, not willing, rather not willing, rather willing, willing, absolutely willing

Table 15. Structured overview of the patient questionnaire

The questionnaire was developed using results from a previous prevalence study on self-administration of medication,⁵ and a literature review on potential influencing factors of self-administration, benefits and prerequisites for self-administration of medication.^{4,8,9} The questionnaire was completed, if needed with the help of the interviewer who wrote down the answers for the participant. Data collection was conducted between November and December 2015.

5.3.4 Study outcomes

The primary outcome of this study was the willingness of patients to self-administer medication during hospitalization and their attitude towards self-administration of medication. The secondary outcome of this study were the patient characteristics associated with the patients' willingness to self-administer, the ability of patients to self-administer, prerequisites for self-administration of medication, and perceived consequences of self-administration.

5.3.5 Ethical considerations

Permission of the ethics committee of Antwerp University Hospital was received (reference B300201422410). Each patient signed an informed consent document before participating in this study. All collected data were coded.

5.3.6 Data analysis

The Statistical Package for Social Sciences (SPSS) version 24.0 (SPSS Inc, Chicago, IL, USA) was used to analyse the data. Kolmogorov–Smirnov and Shapiro–Wilk tests showed nonnormality of the distributions of age, number of chronic medications taken, the total attitude of patients towards self-administration of medication and their willingness to self-administer. Nonparametric 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. A p-value ≤ 0.05 was considered as statistically

significant. The willingness of patients to self-administer medication during hospitalization was questioned with the use of a six-point Likert scale. The attitude of patients towards self-administration of medication in hospital was questioned by a set of five questions, which could be answered with the use of a four-point Likert scale. Out of this set of questions, the first four questions were combined into a scale to describe the overall attitude towards self-administration of medication (see Table 17 for the content of these questions). Before including all questions into this scale, question four was recoded from a negative into a positive statement. The scale was constructed with the use of a sum score of the four questions, resulting in a number between 0 and 12. The higher the number, the more positive the attitude of the patients. The internal consistency of this scale was calculated with Cronbach's alpha.

5.4 Results

5.4.1 Population

In total 36.3% of all eligible patients (n = 124) participated in the study (see Table 14). The main reasons not to participate were the patients' illness (29.3%), the patient was not present during the time of research (22.8%), and the patient refused to participate (6.7%). Patients were recruited from surgical (51.6%), medical (42.7%), geriatric (3.2%) and rehabilitation wards (2.4%). Table 16 shows the characteristics of all included hospitalized patients; 46.0% were male, the mean age was 60 years old. Primary education was the highest educational level of 15.3%, over half of the population completed secondary education (55.6%), and 16.1% obtained a Bachelor's degree. More extended knowledge of the healthcare system could be expected in 18.9%, currently working in healthcare. Most of the patients remained in hospital in the past 2 years, most of them were hospitalized 1–5 nights (29.0%). Of a total of 124 patients, 77.1% took chronic medications at home. They took five different medications on average. The majority of included patients (92.6%) did completely self-manage these medications at home.

Medication use in the population was related to age. Patients who were taking chronic medication at home were significantly older, compared with those who were not (respectively 62.8 years and 46.1 years, Mann–Whitney U, $p < 0.001$). Furthermore, a positive correlation between the age and the number of chronic medications taken at home was found (Spearman's rho, $r = 0.298$, $p = 0.006$).

5.4.2 Patients' willingness and attitude towards self-administration of medication in hospital

Figure 6 shows the actual willingness of patients to self-administer medication in hospital, if their health condition would allow them to do so. The majority of patients, stated that they were willing to self-administer their medication in hospital (83.9%). The patients' attitude towards self-administration of medication was questioned in five questions (see Table 17).

The results indicated that patients were convinced they should be able to proceed their home routines of medication management while in hospital (85.8%). In addition, patients stated if they wished to and were able to self-administer, they should be allowed to do so in hospital (80.3%). Furthermore, participating hospitalized patients in this study agreed with the statement 'Patients should be stimulated to self-administer medication during hospitalization so they can learn how to take medication correctly' (72.6%). This is in line with the almost 60% of the participants in this study whom did not agree with the quote 'it is always the duty of nurses to prepare and administer medication, even for patients who would be able who do this themselves.' When self-administering medication, 55.7% of the patients did not agree that healthcare professionals need to monitor the medication administration of the patients.

Participant characteristics (n= 124)		
Male (%)		46.0
Age (median [range])		60.5 [18-97]
Age (mean (SD))		59.6 (18.5)
Level of education (%)	None	4.8
	Primary school	15.3
	Secondary school	55.6
	Bachelor	16.1
	Master	8.1
Educated in healthcare (%)		18.9
Working in healthcare (%)		18.9
Hospitalized nights in the past 2 years (%)	0	15.3
	1-5	29.0
	6-10	13.7
	11-15	4.0
	16-30	15.3
	>30	22.6
Chronic medication intake at home	Yes (%)	77.1
	mean (SD)	4.5 (3.5)
Chronic medication management at home (%) (n= 94)	Self-management	92.6
	Aid for preparing	4.3
	Aid for preparing and taking	3.2

SD, standard deviation.

Table 16. Participant characteristics

I think that... n=118	Disagree* (%)	Agree* (%)
1. patients should be able to continue their own home routines of medication preparation and administration when hospitalized.	14.2	85.8
2. if I wish to self-administer and I am able to, I should be allowed to do so during a hospital stay.	19.7	80.3
3. patients should be stimulated to self-administer medication during hospitalization so they can learn how to take medication correctly.	27.4	72.6
4. it is always the duty of nurses to prepare and administer medication, even for patients who would be able who do this themselves.	59.8	40.2
5. I can only self-administer my medication during hospitalization if a healthcare professional monitors me.	55.7	44.3
Total opinion on self-administration of medication*		
Median [range]	8 [0-12]	
Mean (SD)	7.5 (2.7)	

** Disagree: sum of % patients who indicated strongly disagree and disagree; Agree: sum of % patients who indicated agree and strongly agree

* The total opinion was calculated by adding statement 1 - 4. Statement 4 was initially negative and therefore recoded into a positive statement. The internal consistency of this scale is $\alpha = 0.786$.

Table 17. The attitude of patients towards self-administration of medication in hospital

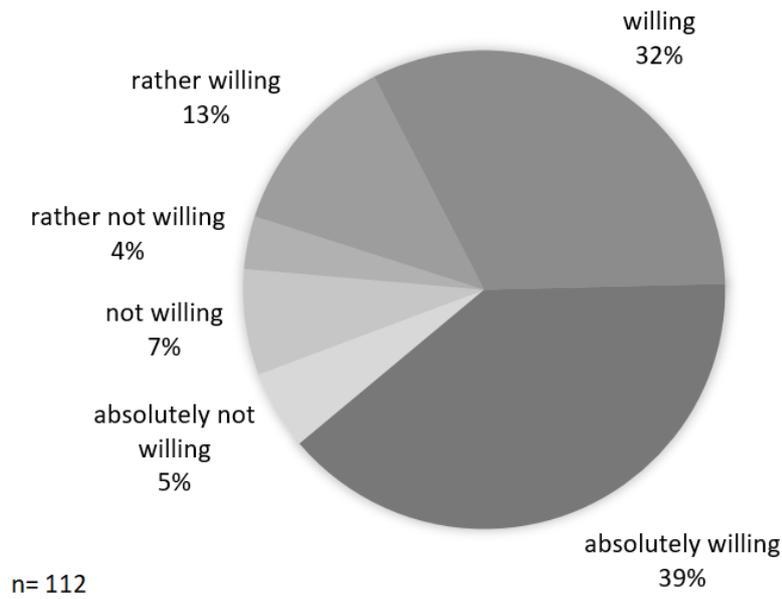
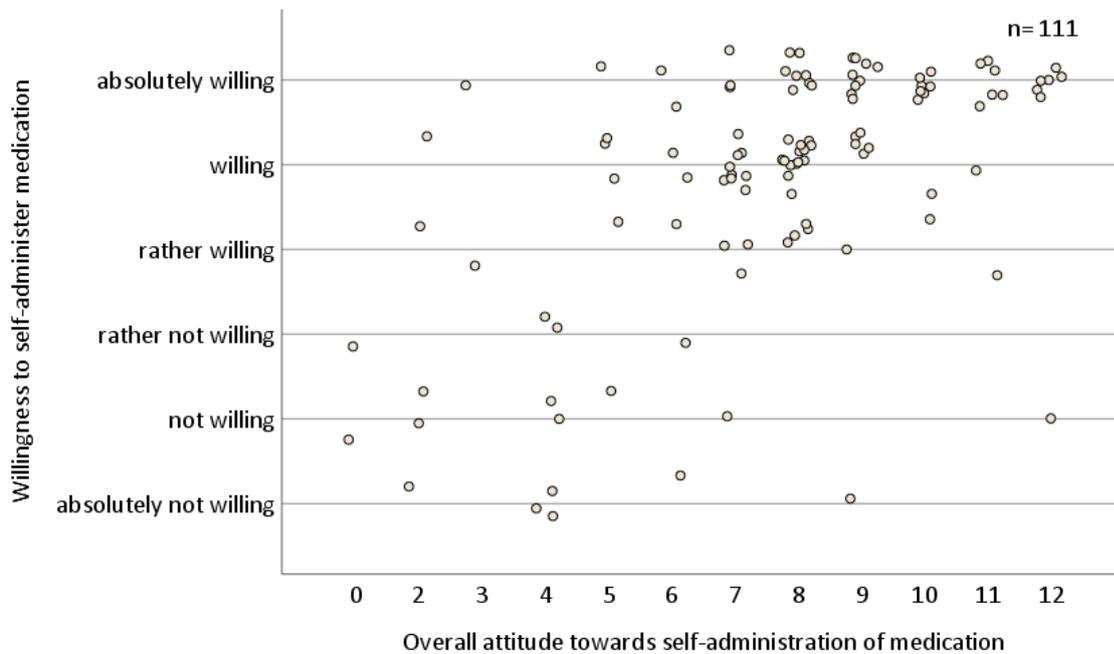


Figure 6. Willingness of patients to self-administer medication in hospital



Spearman's rho, $r = .570$, $p < .001$

Attitude towards self-administration of medication; calculated from questions 1 to 4 ($\alpha = 0.786$); range from 0 to 12.

This figure was built with SPSS, jittering allowed us to show every case.

Figure 7. Relationship between willingness to self-administration of medication and the overall attitude towards self-administration of medication.

As shown in Figure 7 the willingness of patients positively correlated with the patients' overall attitude towards self-administration of medication (Spearman's rho, $r = 0.570$, $p < 0.001$). This overall attitude was calculated by four questions, that were integrated into a scale defining the overall attitude of patients towards self-administration of medication in hospital ($\alpha = 0.786$).

5.4.3 Association between patient characteristics and their willingness to self-administer medication

As described in Table 18, patients in this study who were willing to self-administer medication tended to be younger compared with those who were not [one-way analysis of variance (ANOVA), $p = 0.345$], and did self-administer their chronic medication more often at home (Kruskall–Wallis, $p = 0.306$). The only factor significantly related to the willingness of patients to self-administer was their own perceived ability to self-administer medication in hospital. Patients who were convinced of their own ability to self-administer were more willing to do so compared with those who stated they would need partial or full help with self-administering medication in hospital (Kruskall–Wallis, $p < 0.001$).

	n	Willingness to self-administer medication in hospital						p
		abs. not willing	not willing	rather not willing	rather willing	willing	abs. willing	
Age (years, mean)	112	74.2	63.8	60.5	59.0	58.6	58.3	.345
MM at home (%)								
Self-administration ^a	80	6.3	6.3	2.5	12.5	28.8	43.8	.306
Partial help ^b	4	0.0	0.0	0.0	25.0	50.0	25.0	
Full help ^c	2	50.0	0.0	50.0	0.0	0.0	0.0	
Possibility to self-administer in hospital (%)								
Self-administration ^a	84	2.4	4.8	1.2	8.3	36.9	46.4	<.001
Partial help ^b	15	6.7	6.7	6.7	26.7	26.7	26.7	
Full help ^c	9	33.3	33.3	0.0	22.2	11.1	0.0	

^a Self-administration: patients self-administer their medication completely independent.

^b Partial help: patients receive partial help and administer medication independent.

^c Full help: patients are fully dependent on nurses for medication management.

MM: medication management, abs.: absolutely.

Table 18. Relationship between patient characteristics and their attitude towards self-administration of medication

5.4.4 Patients' ability to self-administer medication in hospital

Patients were questioned about their opinion concerning their own ability to self-administer medication during their hospitalization (see Table 19). If they stated they did take chronic medication, they were questioned about their ability to self-administer these. A total of 80.0% indicated they would be able to self-administer their chronic medication completely independently in hospital, 14.1% would self-administer them independently if they got some help in for example filling their medication box, and 5.9% would be fully dependent on the administration of medication by nurses. If they stated they did not take any chronic medication at home, they were questioned about their ability to self-administer their prescribed medication during hospitalization. A total of 80.8% indicated they would be able to self-administer their medication completely independently, 3.8% would self-administer them independently if they got some help in for example filling their medication box, and 15.4% would be fully dependent on the administration of medication by nurses.

	n	Ability to self-administer medication in hospital			p ^d
		Self-administration ^a	Partial help ^b	Full help ^c	
Chronic medication intake at home (%)					
Yes	85	80.0	14.1	5.9	.896
No	26	80.8	3.8	15.4	

^aSelf-administration: patients able to self-administer their medication completely independent.

^bPartial help: self-administer them independent if they got some help in for example filling their medication box.

^cFull help: be fully dependent on the administration of medication by nurses.

^dMann-Whitney test.

Table 19. Patients' perception of their own ability to self-administer medication in hospital

5.4.5 Prerequisites for self-administration of medication

Patients were questioned about important prerequisites for self-administration of medication (see Figure 8). The majority of participants indicated that patients had to be motivated to self-administer (95.1%) and should already be self-administering medication at home before their hospitalization (88.2%). On top of this, patients acknowledged the importance of a regular evaluation of the patients' ability to self-administer (81.2%). The prospect of returning home after discharge was another important condition (75.0%). Most patients would not mind a combination of self-administered medication and medication administered by nurses (71.6%). Opinions on locking up self-administered medication, receiving the exact same brand of medication during self-administration, and changes in the home medication schedule during hospitalization were divided. Some patients thought these prerequisites to be necessary, others did not. No significant differences between patient characteristics and prerequisites could be found.

Before I self-administer my medication during hospitalization, it is a prerequisite that...
n= 103

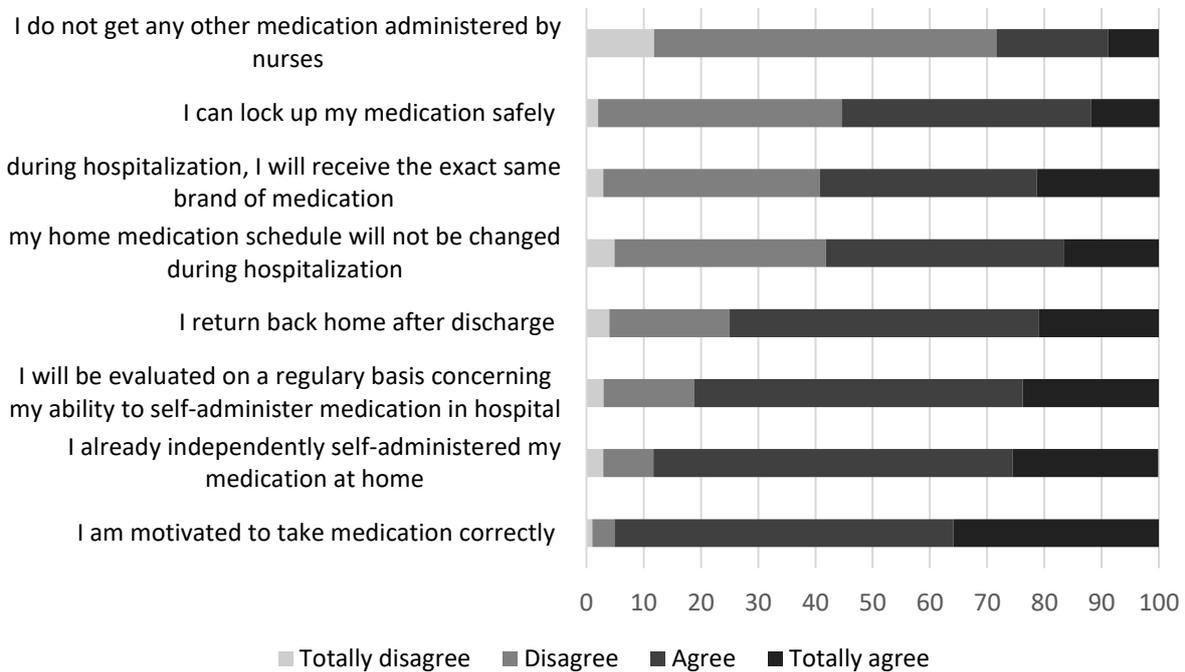


Figure 8. Prerequisites for self-administration of medication

5.4.6 Perceived consequences of self-administration of medication

Hospitalized patients were questioned about the perceived consequences of self-administration of medication in hospital (see Figure 9). A total of three out of four patients were convinced that self-administration would increase their autonomy and the feeling of being independent, it would not jeopardize the safety of other patients, and they would also gain knowledge on the medication through the support they would receive from healthcare professionals. Patients also suggested that self-administration would result in an increased compliance after their discharge (68%) and it would even increase their own safety while in hospital (65.4%). A smaller percentage of the patients indicated that, self-administration would make them more satisfied about their hospital stay (62.4%). Over half of the patients were convinced self-administration would lead to patients taking their medication more correctly compared with administration of medication by nurses (56.7%).

Because of self-administration of medication in hospital...
n= 113

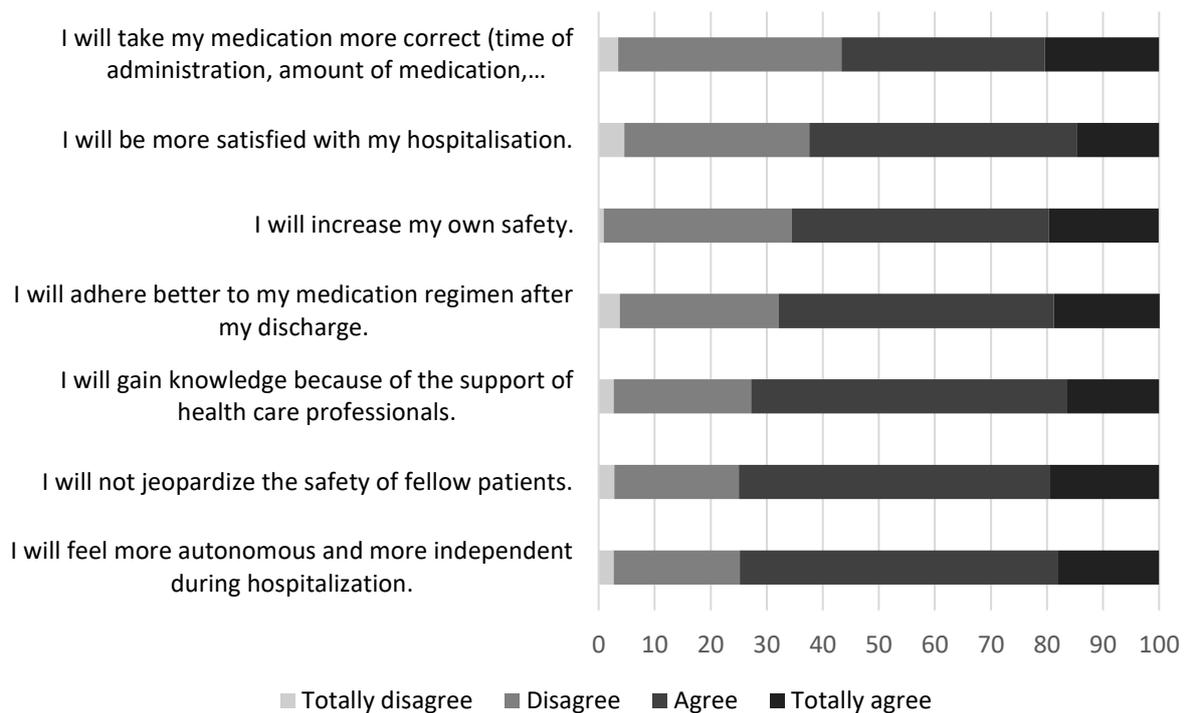


Figure 9. Consequences of self-administration of medication

5.5 Discussion

5.5.1 Main findings: willingness and attitude towards self-administration of medication

The study resulted in valuable insights into the willingness and attitude of hospitalized patients concerning self-administration of medication in hospital. Patients indicated they were very willing to self-administer medication, and they judged themselves capable to do so while in hospital. The majority of the patients would appreciate it, if healthcare providers would facilitate this. They had an overall positive attitude towards self-administration of medication. These findings are consistent with those of Deeks and colleagues who described patients who already self-administered medication were significantly more likely to be willing to self-administer medication again during a future hospitalization.⁴ Also, a qualitative study by Manias and colleagues and Vanwesemael and colleagues indicated patients were positive about self-administration of medication.^{8,9}

Patients were very positive towards maintaining their own home routines in medication management in hospital. Literature indicated this comes with an extra benefit, as it may contribute to increased adherence. A systematic review and meta-analysis on medication adherence difficulties identified that creating a habit-based intervention that links the patients' daily routines to medication administration, results in an increased adherence. When practicing self-administration of medication in hospital, both patients and healthcare professionals can work together to create those links (e.g. take medication right before breakfast).¹⁰ A systematic review on self-administration of medication programmes confirmed the increase of compliance and decrease of medication errors.²

Although, there definitely is a reason to believe self-administration benefits adherence, this might still be very much influenced by the patients' drug regimen. Research by Vanwesemael and colleagues indicated the complexity of a patients' drug regimen as an important obstacle to implement self-

administration. A relevant quote underpinned this issue; 'Medication for kidney patients is so delicate, so precise that they (care team) want to have it all in their own hands. We will rarely be able to put a red star next to a kidney patient [mark of self-management of medication.]' (Nurse 1). This study not only highlighted a complex regimen as an obstacle, also changes due to medical examinations that influenced the drug regimen.⁹

Also, patients in this study indicated self-administration as a possibility to learn how to take medication correctly. This might impact medication-related problems after discharge. A Dutch study on patients' medication-related problems after hospital discharge (n = 124) indicated 15% of the population experienced medication-related problems (e.g. the indication and how to use the medication was not clear) and 27% reported side effects after hospital discharge.¹¹ Allowing patients to already self-administer medication in hospital provides a certain amount of days to observe the patients' medication management. When observing medication errors, healthcare professionals have the opportunity to detect errors in patients' home routines, and are able to react and implement interventions. A systematic review on the effects of self-administration of medication confirms the positive effect on increased knowledge about medication and medication regimens.³

Concerning patients, being able to already self-administer in hospital allows them to practice unfamiliar medication administration routes before being discharged.^{8,9} In conclusion, observing and evaluating patients' self-administration of medication management is of great importance. Yet, in order to be able to sufficiently and correctly evaluate this medication management, it is necessary that patients stay hospitalized for a sufficiently long period of time.

5.5.2 Secondary outcomes

The association between patient characteristics and their willingness to self-administer was reported. Younger patients tended to be more willing to self-administer their medication. This result seems to be consistent with other research which found self-administering patients were on average younger compared with nonself-administering patients (self-administering patients: 52.7 years; nonself-administering patients: 66.4 years; $p < 0.001$).⁵ The current study did not investigate the association between patient characteristics such as functional status, disease severity, or length of stay and their willingness to self-administer. A previous study however indicated self-administering patients were mostly women, had a lower number of different medications per day before and after their hospitalization. Self-administering patients mostly came from their own home environment and returned back there after discharge. Also, self-administering patients had a better general health status and were less depending on nursing aid during their hospital stay.⁵

The participating patients were asked to judge for themselves whether they would be able to self-administer their medication in hospital. If they already took chronic medication at home, it concerned this medication. If they did not take any medication at home before hospitalization, it concerned the medication administered during their hospitalization. There were no significant differences found between the group of patients who already took chronic medication at home or patients who did not and their own perceived ability to self-administer. Overall, patients judged themselves capable to self-administer. Nevertheless, this cannot be the only evaluation before actually performing self-administration in hospital. Literature clearly described the necessity of an assessment to objectively define the actual competencies and ability of the patient. This assessment should take several aspects into account, that is, specific conditions related to the patients; mental and physical condition, conditions related to the type of medication; high/low-risk medication, intravenous medication.⁹

Important prerequisites for self-administration of medication were questioned. More than half of the patients did not consider it necessary to have healthcare professionals monitor patients while self-

administering medication. This might be explained by the majority of patients estimating themselves able to self-administer medication in hospital. They assumed by being able to self-administer, they did not need any monitoring while doing so.

Compared with patients indicating monitoring is not really needed, 81% considered it necessary that patients were regularly evaluated on their ability to self-administer medication. These findings highlight another aspect namely evaluation of the patients' competences in order to self-administer medication. Patients do think it is necessary to evaluate patients on their capabilities or competences to self-administer. At this moment, several existing self-administration of medication programmes include a tool to evaluate patients' competences in order to self-administer.³ Nevertheless, only two articles described the validation of a tool, named Self-Administration of Medication (SAM). This tool aimed to objectively determine patients' ability to self-administer.^{12,13} These findings confirm the need for further research on the validation of tools in different patient populations. If patients are deemed capable to self-administer their medication, patients did not consider it necessary to be monitored by professionals. Yet, from the healthcare professional point of view a monitoring system for self-administration is recommended. In Belgium, it is possible to allow self-administration of medication. Yet, if implemented, this has to be noted in the patients' personal medical file, and it has to be clearly described which medication is self-administered and which is administered by the nurses. Healthcare providers have a duty of care and a duty of surveillance at all time. If any problems occur during self-administration, these have to be noted in the medical files. The treating physician is then held responsible (Care Inspection of the Flemish Division of Wellbeing, Public Health and Family, personal communication, October 2015). The duty of care and surveillance allows healthcare providers to identify possible medication errors and implement patient tailored interventions. Again, these interventions might prevent medication errors occurring after hospital discharge.^{2,3,5}

Participants in this study indicated some prerequisites for self-administration of medication, for example, only patients who already self-administered medication at home before hospitalization, and will be self-administering after discharge should be allowed to self-administer medication. These study findings might be combined with previous study findings from Vanwesemael and colleagues resulting in a list of prerequisites for patients before allowing self-administration of medication in hospital.⁵

From this study, we are able to conclude that patients believe it is possible to combine self-administration of medication and administration of medication by nurses. Nevertheless, it was suggested that combining both should be communicated clearly with the patient in order to prevent a lack of clarity. Also, communicating clearly about any changes in the medication schedule is considered important, because 58.2% of the patients stated, 'not changing the medication schedule from home during hospitalization' as a prerequisite for self-administration. This communication might prevent problems concerning the medication schedule after discharge.

A study by Manias and colleagues showed several patients were worried about possible misuse of their medication by others.⁸ This result was also discussed by Vanwesemael and colleagues this study suggested lockers to safely store medication and prevent other patients from abusing or stealing medication.⁹ However, findings in this study indicated patients did not fully agree on the fact that a locker for storing their medication is necessary. In the end, it should always be stated clearly in the hospital self-administration of medication policy whether it is essential to lock away self-administered medication or where to store this (e.g. inside a locker).

At the end of the questionnaire, possible perceived consequences of self-administration of medication were questioned. These study findings are in line with previous quantitative and qualitative research. Specifically, an increased autonomy or feeling of being independent, increased patient satisfaction,

gaining knowledge on medication, and increasing compliance after discharge were previously described.^{3,4,8} This study added more insights into the patients' beliefs about the safety of self-administration: they did not especially worry about their own or others safety while self-administering.

5.5.3 Implications for practice

The main objective of this study was to gain an insight in the willingness and attitude of hospitalized patients towards self-administration of medication. Given the very positive results and the willingness of patients to self-administer, focus on increasing the implementation of this concept in daily practice is of foremost importance.

While in our study patients who were willing to self-administer were younger, this did not reach statistical significance. Previous research did prove self-administering patients tended to be younger, more healthier and rather independent during their hospital stay. Also, these patients were more prevalent on surgical short-stay wards, psychiatric wards, surgical wards, and medical wards. These observations give insight in the implementation of self-administration on different types of wards and their patients who would self-administer medication during hospitalization.⁵

When implementing self-administration of medication in hospital, some barriers should be overcome. Due to hospital admission, patients will receive medication from the current hospital formulary.⁶ This might result in patients receiving other types or brands of medication. From the study results it is not possible to conclude whether this might be a major obstacle for implementing safe self-administration of medication. Nevertheless, it has to be considered how to tackle problems concerning recognisability of medication. This might be an opportunity to strengthen a multi-disciplinary team approach to achieve better and safer medication management in consultation with the patient.¹⁴ On top of this, previous literature already mentioned medication shortages in hospital pharmacies, which have a significant influence on medication management.¹⁵

When allowing patients to self-administer medication, the current routines of medication management will change. These changes and differences compared with administration of medication by nurses should be well described; protocols or procedures for self-administration of medication could enhance clarity on both the process and the role of every stakeholder (patient, nurse, practitioner, hospital pharmacist). In order to realize these protocols, it is recommended to question patients, nurses, practitioners, and hospital pharmacists in a qualitative study concerning their opinions on self-administration of medication, possible barriers or facilitators within their organization or ward. Afterwards, a protocol could be developed and tested for validation in daily practice. As this study showed, important aspects which should be included in a self-administration of medication protocol consist of (1) a tool to screen patients' competences before allowing them to self-administer, (2) a monitoring tool to monitor the intake of self-administered medication, (3) a support tool to both support patients while self-administering (e.g. provide education on medication preparation or intake), and healthcare providers (e.g. additional information on medication or how to educate patients). When testing and validating a self-administration of medication protocol, we should try to investigate how to overcome any organizational restraints in order to improve patients care, without jeopardizing the patient safety.

Implementing self-administration of medication implies that patients need to be hospitalized for a sufficiently long period of time. At first, there will be time needed to assess the patients' capability and willingness to self-administer. Secondly, the process of self-administration should be started, medication should be prepared, patients might need to be educated concerning their (newly prescribed) medication. Thirdly, patients should be monitored while self-administering, in order to be

able to assess their actual abilities and, if needed, provide interventions to improve adherence or medication knowledge.⁹

Because of the inclusion of several aspects such as supporting, screening, monitoring and empowering patients, the term self-administration of medication does not fully cover all these aspects. Therefore, it is suggested to install the term self-management of medication in hospital, which tries to define a broader range of aspects which need to be looked into when self-administering medication in hospital.

5.5.4 Strengths and limitations

A strength of this study was the random inclusion of several wards in two university and one general hospital. Due to this sample, a diversity of patients were included in the study sample. Also, a random inclusion of surgical, medical, geriatric and rehabilitation wards resulted in attitudes from different types of patients hospitalized for different types of medical backgrounds.

Despite including a very diverse sample, the total number of participating patients was rather low. It is not possible to make statements concerning the willingness and attitude of all hospitalized patients towards self-administration of medication. The main reason for this is that 29% of the eligible patients did not participate in the study due to the severity of their illnesses. Therefore, the results of this study reflected the willingness of the healthier or fitter rather than the acutely or severely ill hospitalized patients. Also, because of the use of a questionnaire, it could have been more likely that only patients with a more positive attitude participated in the study.

On the other hand, as the findings of our study confirm previous findings in international qualitative studies we can assume they are generalizable for this type of hospitalized patients internationally.

5.6 Conclusion

The majority of patients were very positive towards self-administration of medication, and they were definitely willing to effectively self-administer their medication in hospital. This positive attitude will facilitate the implementation of self-administration of medication. The stated prerequisites such as a motivated patient, and a regular evaluation of the patients' abilities should be considered before allowing patients to self-administer medication in hospital. Patients acknowledged some positive benefits such as increased autonomy, independence, and knowledge on their medication. They were not worried about jeopardizing the safety of others, nor were they worried about their own safety when self-administering medication in hospital. In future research, it is important to implement self-administration of medication in hospital with the use of a well-designed and validated protocol, and to study outcomes such as patient satisfaction, knowledge, medication errors, and adherence after discharge in order to objectively investigate the impact of self-administration of medication.

5.7 Authors' note

Toke Vanwesemael is also affiliated to the Department of Healthcare, Thomas More University College, Lier, Belgium.

5.8 Funding

Research for this paper was financially supported by the Thomas More University College.

5.9 Conflict of interest statement

The authors declare that there is no conflict of interest.

5.10 References

1. Parnell MA. Medicines at the bedside. *Am J Nurs* 1959; 59: 1417–1418.
2. Wright J, Emerson A, Stephens M, et al. Hospital inpatient self-administration of medicine programmes: a critical literature review. *Pharm World Sci* 2006; 28: 140–151.
3. Richardson SJ, Brooks HL, Bramley G, et al. Evaluating the effectiveness of self-administration of medication (SAM) schemes in the hospital setting: a systematic review of the literature. *PLoS One* 2014; 9: e113912.
4. Deeks PA and Byatt K. Are patients who self-administer their medicines in hospital more satisfied with their care? *J Adv Nurs* 2000; 31: 395–400.
5. Vanwesemael T, Van Rompaey B, Petrovic M, et al. SelfMED: self-administration of medication in hospital: a prevalence study in Flanders, Belgium. *J Nurs Scholarsh* 2017; 49: 277–285.
6. Royal decree setting out the standards which hospital pharmacies must meet to be authorized.1991. Available at: www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=nl&la=N&table_name=wet&cn=191030433
7. McLeod M, Ahmed Z, Barber, et al. A national survey of inpatient medication systems in English NHS hospitals. *BMC Health Serv Res* 2014; 14: 93.
8. Manias E, Beanland C, Riley R, et al. Self-administration of medication in hospital: patients' perspectives. *J Adv Nurs* 2004; 46: 194–203.
9. Vanwesemael T, Boussery K, Manias E, et al. Self-management of medication during hospitalisation: healthcare providers' and patients' perspectives. *J Clin Nurs* 2018; 27: 753–768.
10. Conn VS, Ruppar TM, Enriquez M, et al. Medication adherence interventions that target subjects with adherence problems: systematic review and meta-analysis. *Res Social Adm Pharm* 2016; 12: 218–246.
11. Eibergen L, Janssen MJA, Blom L, et al. Informational needs and recall of in-hospital medication changes of recently discharged patients. *Res Social Adm Pharm* 2018; 14: 146–152.
12. Anderson J, Manias E, Kusljic S, et al. Testing the validity, reliability and utility of the Self Administration of Medication (SAM) tool in patients undergoing rehabilitation. *Res Social Adm Pharm* 2014; 10: 204–216.
13. Manias E, Beanland CJ, Riley RG, et al. Development and validation of the self-administration of medication tool. *Ann Pharmacother* 2006; 40: 1064–1073.
14. Adhikari R, Tocher J, Smith P, et al. A multidisciplinary approach to medication safety and the implication for nursing education and practice. *Nurse Educ Today* 2014; 34: 185–190.
15. Preece D and Price R. PS-076 The problem of medicines shortages in hospitals across Europe: the European Association of Hospital Pharmacists (EAHP) Survey. *Eur J Hosp Pharm Sci Pract* 2014; 21: A174–A175.



Chapter 6

The attitude and opinion of healthcare providers on self-administration of medication by hospitalized patients

Outline

6	The attitude and opinion of healthcare providers on self-administration of medication by hospitalized patients	95
6.1	Introduction	95
6.2	Methods	96
6.2.1	Design	96
6.2.2	Participants	96
6.2.3	Data collection	96
6.2.4	Study outcomes	97
6.2.5	Data analysis	97
6.2.6	Ethical considerations	97
6.3	Results	97
6.3.1	Population	97
6.3.2	Medication management	97
6.3.3	Healthcare providers' willingness	99
6.3.4	Overall attitude towards self-administration of medication	99
6.3.5	Prerequisites for self-administration for medication	101
6.3.6	Consequences of self-administration of medication	102
6.3.7	Supportive measures for self-administration of medication	105
6.3.8	Patients competences for self-administration of medication	105
6.4	Discussion	106
6.4.1	Healthcare providers' willingness and attitude	106
6.4.2	Self-administration of medication in daily practice	107
6.4.3	Consequences of self-administration of medication	107
6.4.4	Strengths and limitations	108
6.5	Conclusion	108
6.6	References	109

6 The attitude and opinion of healthcare providers on self-administration of medication by hospitalized patients

6.1 Introduction

Self-administration of medication is not an exceptional approach of medication management. A recent cross-sectional multicenter observational study conducted in Flemish hospitals indicated 22% of hospitalized patients self-administered at least one of their medicines. Concerning the opinion of the head nurses on the included wards, even more patients would be able to self-administer medication. They deemed 40.9% of the patients capable of fully self-administering medication (prepare and take medication independently during hospitalization), and an additional 20.8% was deemed able to self-administer medicines if they were prepared in for example a pill case (Vanwesemael, Van Rompaey, Petrovic, Boussery, & Dilles, 2017). Literature on this topic described some advantages such as an increased patient satisfaction and an improvement of adherence to pharmacotherapy and self-care competence (Richardson, Brooks, Bramley, & Coleman, 2014; Wright, Emerson, Stephens, & Lennan, 2006).

When self-administration of medication occurs in hospital, several stakeholders are included during this process: the treating physician, nurses and the patient. Hospital pharmacists are rather exceptionally involved (Vanwesemael et al., 2017). In facilitating and providing self-administration of medication in daily practice, the opinion of all these stakeholders is important. In order to evaluate this opinion, previous qualitative research on healthcare providers' and patients' perspectives concerning self-administration of medication in hospital was conducted. This study identified strengths, weaknesses, opportunities and threats (SWOT) of self-administration. The qualitative study results also confirmed previous findings and reported even more in-depth knowledge on the opinion of nurses, physicians and hospital pharmacists (Deeks & Byatt, 2000; Manias, Beanland, Riley, & Baker, 2004; Vanwesemael, Boussery, Manias, et al., 2018). The SWOT-analysis revealed following main themes and subthemes:

- Strengths of self-administration of medication
 - Benefits for patients
 - Benefits for nurses
 - Benefits for collaboration
- Weaknesses of self-administration of medication
 - Disadvantages for patients
 - Disadvantages for nurses
 - Disadvantages for physicians
- Opportunities for self-administration of medication
 - Opportunities related to the organization
 - Opportunities related to the patient
 - Opportunities related to the implementation
- Threats for self-administration of medication
 - Obstacles related to the implementation
 - Obstacles concerning medication

In order to evaluate the identified themes from the qualitative study, this quantitative study questioned a larger sample of nurses, physicians and hospital pharmacists from several institutions and with different work environments. This study aimed to identify their willingness to allow self-

administration of medication, their attitude towards it, prerequisites and perceived consequences of self-administration of medication in hospital.

6.2 Methods

6.2.1 Design

This quantitative observational cross-sectional study was the second part of a mixed method research (Vanwesemael, Boussery, Manias, et al., 2018). Healthcare providers were questioned in a structured interview on their willingness, attitude, prerequisites and consequences of self-administration.

6.2.2 Participants

Two university hospitals and one regional hospital were invited to participate, as were two nursing associations, an association of physicians and one of hospital pharmacists. All institutions and organizations consented to participate in the study. All nurses, physicians and hospital pharmacists within these organizations, could participate if they were currently working in a Flemish hospital, students were excluded.

6.2.3 Data collection

A structured online questionnaire was used. Hospitals forwarded an invitation for participation to all nurses, physicians and hospital pharmacists within their organization; it included the hyperlink for completing the online questionnaire. One nursing association published an article in the Flemish "Nursing" journal concerning the topic of self-administration of medication and invited their readers to complete the online questionnaire (see Appendix III). Information concerning the study and the hyperlink was provided on their website. The second nursing association provided information concerning the study and the hyperlink on the associations' blog. The professional organization of physicians provided a topic in their electronic newsletter "e-specialist" with information and the hyperlink. The professional organization for hospital pharmacists e-mailed their members an invitation to participate the study with access to the hyperlink.

The questionnaire was developed using results from a previous prevalence study on self-administration of medication (Vanwesemael et al., 2017), and was based on the results of a SWOT analysis of self-administration of medication in hospital (Vanwesemael, Boussery, Manias, et al., 2018). First, healthcare providers were questioned on demographic characteristics and information concerning their work environment. Information on their work environment concerned; their involvement in patients' managing chronic medication (1 question), whether they were responsible in hospital for patients who self-administered their chronic medication at home (1 question), how they prepared patients for their hospital discharge (1 question) and whether their hospital ward allowed self-administration of medication (1 question). Second, the perception towards medication self-administration was evaluated with the use of seven statements (4-point Likert scale: strongly disagree, disagree, agree, strongly agree). The third section of the questionnaire concerned the willingness of healthcare providers (1 question, 6-point Likert scale; absolutely not willing, not willing, rather not willing, rather willing, willing, absolutely willing) and 11 statements concerning possible prerequisites for self-administration of medication (4-point Likert scale: absolutely not important, rather not important, rather important, absolutely important). Also, 12 statements concerning possible consequences of medication self-administration were evaluated (4-point Likert scale: strongly disagree, rather disagree, rather agree, strongly agree). In conclusion, respondents were questioned about the required content of a tool to support medication self-administration in hospitals and which items should be evaluated on the level of the patient in order to perform an evaluation of the patient's competences for self-administration of medication.

6.2.4 Study outcomes

The primary outcome of this study was the willingness of healthcare providers to let patients self-administer their medication and their attitude towards self-administration of medication in hospital (overall attitude, prerequisites for self-administration and consequences of self-administration). Secondary outcomes concerned the results on the content of supportive measures for self-administration and items patients' should be evaluated on in order to assess their self-administration competences.

In this study we focused on medicines which were already taken before hospital admission or will be after discharge. Self-administration of medication was defined as: "Hospitalized patients who store, prepare and administer their medication themselves, if necessary supported by physicians, nurses and hospital pharmacists."

6.2.5 Data analysis

The Statistical Package for Social Sciences (SPSS) version 24.0 (SPSS Inc, Chicago, IL, USA) was used to analyze the data. Shapiro–Wilk tests showed nonnormality of the distributions of age and work experience. Nonparametric statistics were used to analyze 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. A p-value ≤ 0.05 was considered statistically significant.

6.2.6 Ethical considerations

Permission of the ethics committee of Antwerp University Hospital was received (reference B300201422410). Each participant received information before completing the study. By completing the questionnaire, the participant provided consent. All collected data were coded.

6.3 Results

6.3.1 Population

As shown in Table 20, a total of 271 healthcare providers participated in this study; 159 nurses, 75 physicians and 36 hospital pharmacists. The respondents were on average 42 years old, and the majority were female (64.9%). Most of them had an employment rate over 80%. The majority of nurses and physicians were working on surgical and medical wards.

6.3.2 Medication management

The majority of nurses and physicians who participated the study were responsible for patients on chronic medication treatments in their daily practice. Also, the majority were responsible for a population of patients who self-administer their chronic medication at home.

A total of 54.6% participating healthcare providers stated their hospital ward allowed self-administration of medication. Yet, of these 40.2% stated patients were not standardly evaluated in order to facilitate self-administration of medication.

The role of nurses, physicians and hospital pharmacists differed when it came to discharge planning. Just over 61.6% of nurses prepared the medication list for patients, 64.8 % delivered this list to the patient and 69.2% discussed this with the patient or the family. Significantly less physicians performed these actions (respectively 56.6%, 51.3% and 28.9%), and hospital pharmacists did even fewer (11.1%, 8.3% and 8.3%, $p < .001$) (see Table 21).

	Total (n=271)	Nurses (n= 159)	Physicians (n 76)	Hospital pharmacist (n= 36)	p-value
Demographic data					
Age (year)					
median (min-max)	40.0 (21.0-70.0)	37.0 (21.0-63.0)	52.0 (27.0-70.0)	31.5 (24.0-50.0)	<0.001 ^a
mean [SD]	41.5 [11.8]	39.7 [11.1]	49.1 [10.7]	33.3 [7.9]	
Gender (%)					<0.001 ^b
Male	35.1	21.4	75.0	11.1	
Female	64.9	78.6	25.0	88.9	
Work experience (yr, median (min-max))	15.0 (0.3-42.0)	14.0 (0.3-42.0)	24.0 (1.0-40.0)	7.0 (1.0-26.0)	
Work characteristics					
Employment rate (%)					0.020 ^b
<50%	0.7	0.6	1.3	0.0	
50%-80%	21.8	28.3	9.2	19.4	
>80%	77.5	71.1	89.5	80.6	
Type of ward %(n)*					
Surgical ward	22.1 (60)	22.6 (36)	31.6 (24)	0.0 (0)	0.001 ^b
Medical ward	17.3 (47)	22.6 (36)	14.5 (11)	0.0 (0)	0.004 ^b
Rehabilitation ward	4.1 (11)	5.0 (8)	3.9 (3)	0.0 (0)	0.385 ^b
Geriatric ward	8.5 (23)	10.1(16)	6.6 (5)	5.6 (2)	0.532 ^b
Neurological ward	3.3 (9)	4.4 (7)	2.6 (2)	0.0 (0)	0.381 ^b
Psychiatric ward	18.1 (49)	25.2 (40)	7.9 (6)	8.3 (3)	0.001 ^b
Pediatric ward	3.0 (8)	4.4 (7)	1.3 (1)	0.0 (0)	0.226 ^b
Maternity	2.6 (7)	1.9 (3)	5.3 (4)	0.0 (0)	0.180 ^b
Intensive neonatal care	0.4 (1)	0.6 (1)	0.0 (0)	0.0 (0)	0.702 ^b
Emergency	2.6 (7)	0.6 (1)	6.6 (5)	2.8 (1)	0.027 ^b
Operating theatre/ Recovery	5.9 (16)	0.6 (1)	19.7 (15)	0.0 (0)	<0.001 ^b
Intensive care	9.2 (25)	8.2 (13)	15.8 (12)	0.0 (0)	0.020 ^b
Hospital pharmacy	12.2 (22)	0.0 (0)	0.0 (0)	91.7 (33)	<0.001 ^b
Other	13.3 (36)	9.4 (15)	25.0 (19)	5.6 (2)	0.002 ^b

* Multiple answers were allowed.

^a Kruskal Wallis test

^b Chi-Square test

Table 20. Demographic and work characteristics

	Total (n= 271)	Nurses (n= 159)	Physicians (n= 76)	Hospital pharmacist (n= 36)
Proportion of patients under their responsibility who take chronic medication (%)				
0%-25%	7.5	6.6	9.3	
26%-50%	14.1	10.5	21.3	
51%-75%	24.2	25.7	21.3	
76%-100%	54.2	57.2	48.0	
Proportion of patients under their responsibility who self-administer chronic medication at home (%)				
0%-25%	19.8	23.0	13.3	
26%-50%	20.3	21.1	18.7	
51%-75%	28.2	25.7	33.3	
76%-100%	31.7	30.3	34.7	
Self-administration of medication on hospital ward (%)				
No	45.4	32.7	73.7	41.7
Yes, but not standardly evaluated for each patient	40.2	48.4	18.4	50.0
Yes, standardly evaluated for each patient	14.4	18.9	7.9	8.3
Actions undertaken for preparing a hospital discharge (% yes)* ¹				
Prepare a medication list for the patient at home	53.5	61.6	56.6	11.1
Deliver a medication list for the patients' family doctor	26.9	22.6	46.1	5.6
Deliver a medication list for the patient at home	53.5	64.8	51.3	8.3
Discuss the medication list with the patient and/or family	49.8	69.2	28.9	8.3
Provide patient education in order to promote self-administration and therapy adherence	31.7	42.8	21.1	5.6
None of the above	24.0	10.7	22.4	86.1

* Multiple answers were allowed.

¹ p-value of every difference on actions for discharge between healthcare providers <.001; Chi Square

Table 21. Characteristics on medication management

6.3.3 Healthcare providers' willingness

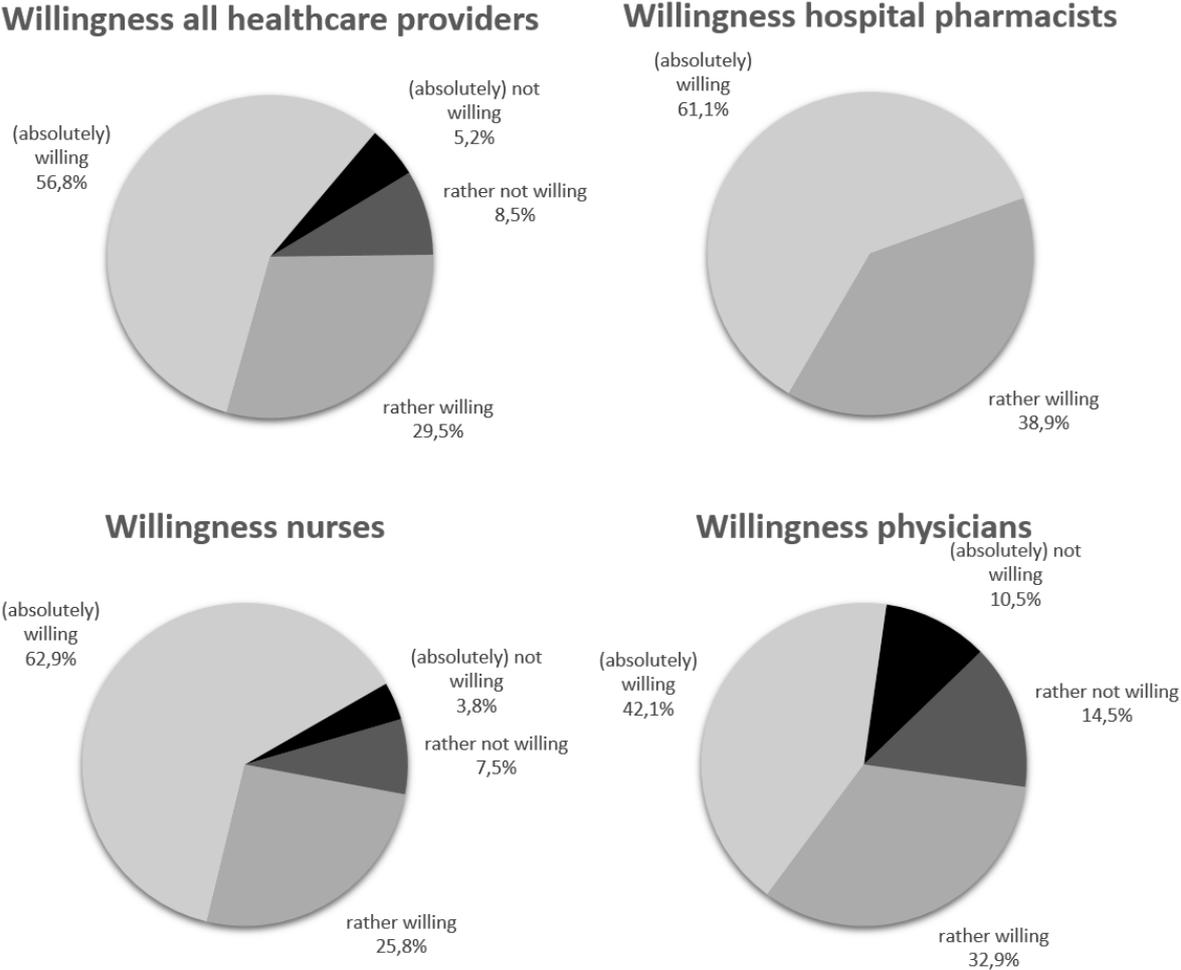
Figure 10 shows the actual willingness of healthcare providers to allow self-administration of medication in hospital. A total of 88.7% of the nurses, 75.0% of the physicians and 100% of the hospital pharmacists were willing to allow this (p= .002, Kruskal Wallis Test).

6.3.4 Overall attitude towards self-administration of medication

The healthcare provider's attitude towards self-administration of medication was questioned with the use of seven statements (see Table 22).

It was observed a narrow majority of physicians (53.9%) deemed it the role of nurses to prepare and administer medication, independent of the ability of patients to be able to self-administer. This was in contrast to 28.3% of nurses and 22.2% hospital pharmacists agreeing this statement (p <.001). The majority of healthcare providers agreed on allowing patients to self-administer medication if they were found able. In addition, they agreed patients should be stimulated to self-administer so they can learn how to take medication correctly, as should they be able to continue own home routines on medication during hospitalization. Nevertheless, physicians always agreed less with these statements compared to nurses and hospital pharmacists (resp. p =.007, p =.009, p =.002). Nurses and physicians agreed less with the statement of involving a hospital pharmacist during the decision-making on allowing or declining patients to self-administer (respectively 21.4% and 35.5%), compared to hospital pharmacists (72.2%, p <.001).

All healthcare providers were convinced patients can only self-administer medication if a professional monitors their medication intake. Although, nurses agreed least on this statement (56.0%) compared to physicians (69.7%) and hospital pharmacists (88.9%) ($p < .001$). In the end, over half of the physicians (55.3%) deemed themselves capable to decide on his/her own whether a patient can self-administer medication. This significantly differed from only 22.0% of nurses agreeing they could decide this and 27.8% of hospital pharmacists ($p < .001$).



Legend
 Willingness all healthcare providers: n= 271
 Willingness hospital pharmacists: n= 36
 Willingness nurses: n= 159
 Willingness physicians: n=76
 Difference between the willingness of the three disciplines $p= .002$; Kruskal Wallis Test

Figure 10. Willingness of healthcare providers to allow self-administration of medication in hospital

Attitude towards self-administration of medication (n= 271)	Agree*	Disagree*	p-value ¹
1 It is always the duty of nurses to prepare and administer medication, even for patients who would be able who do this themselves.**	34.7	65.3	
Nurses	28.3	71.7	
Physicians	53.9	46.1	<.001
Hospital pharmacists	22.2	77.8	
2 If patients wish to self-administer and are able to, they should be allowed to do so during a hospital stay.	78.6	21.4	
Nurses	84.9	15.1	
Physicians	67.1	32.9	.007
Hospital pharmacists	75.0	25.0	
3 Patients should be stimulated to self-administer medication during hospitalization so they can learn how to take medication correctly.	83.4	16.6	
Nurses	87.4	12.6	
Physicians	72.4	27.6	.009
Hospital pharmacists	88.9	11.1	
4 Patients should be able to continue their own home routines on medication preparation and administration when hospitalized.	78.9	21.1	
Nurses	85.5	14.5	
Physicians	65.8	34.2	.002
Hospital pharmacists	77.8	22.2	
5 It is important to involve a hospital pharmacist when making the decision of allowing or declining patients to self-administer their medication during hospitalization.	32.1	67.9	
Nurses	21.4	78.6	
Physicians	35.5	64.5	<.001
Hospital pharmacists	72.2	27.8	
6 Patients can only self-administer their medication during hospitalization if a healthcare professional monitors the medication intake.	74.3	35.8	
Nurses	56.0	44.0	
Physicians	69.7	30.3	<.001
Hospital pharmacists	88.9	11.1	
7 As a healthcare provider, I can decide on my own whether patients can self-administer their medication whilst in hospital	32.1	67.9	
Nurses	22.0	78.0	
Physicians	55.3	44.7	<.001
Hospital pharmacists	27.8	72.2	

* Disagree: sum of % healthcare providers who indicated strongly disagree and disagree; Agree: sum of % healthcare providers who indicated agree and strongly agree.

** This statement was phrased negatively in the questionnaire.

¹ Differences between healthcare providers was calculated with the use of the Chi Square test.

Table 22. The attitude towards self-administration of medication in hospital

6.3.5 Prerequisites for self-administration for medication

Healthcare providers were questioned about prerequisites for self-administration of medication (see Table 23). The results could be subdivided into prerequisites related to the patient (statement 1-3) and those related to facilitating implementation and organization of self-administration of medication (statement 4-11).

Healthcare providers agreed all three prerequisites related to the patient were important. These included; a patient should be motivated to take medication correctly, s/he should already self-administer his/her medicines at home, and s/he should return back home after discharge.

A total of eight prerequisites related to facilitating and organizing self-administration of medication in daily practice. Overall, the majority of healthcare providers indicated evaluating the patient's competences for self-administration on a regular basis and medication reconciliation as an important prerequisite. Also, healthcare providers agreed the hospital pharmacy should deliver the patient's home medicines. Both nurses and physicians found receiving the exact same brand of medication for self-administration important. This was in complete opposite to the opinion of hospital pharmacists, who deemed this not important ($p < .001$). The overall opinion concerning locking up self-administered medication safely on the patient's room showed this was an important prerequisite. Nevertheless, hospital pharmacists deemed this far more important compared to nurses and physicians ($p = .011$). The prerequisite of patients not receiving both self-administered and nurse administered medicines, was the only one deemed not important.

6.3.6 Consequences of self-administration of medication

Nurses, physicians and hospital pharmacists were questioned on 12 potential consequences of self-administration of medication (see Table 24). Eight consequences were related to the patient (statement 1-8), four related to healthcare providers or the hospital (statement 9-12).

All healthcare providers agreed the patient's knowledge would increase due to their support when self-administering, patients would also be more satisfied with their hospital stay, and self-administering patients would adhere better to their medication after discharge. Also, all healthcare providers agreed patients would feel more autonomous and more independent during hospitalization. Nevertheless, physicians agreed to a lesser extent compared to nurses and hospital pharmacists (respectively 82.2%, 96.1% and 100% , $p < .001$). The healthcare providers did not agree on one consequences, which indicated self-administration, would result in a financial benefit for the patient. Variation between the opinions of healthcare providers was seen in whether patients who self-administer would take their medicines more correctly compared to nurse-administered medicines. Almost 70% of nurses and hospital pharmacists agreed on this statement, this in contrast with only 50.7% of physicians who agreed this statement ($p = .032$).

The remaining statements related to healthcare providers or the hospital. It was observed healthcare providers agreed self-administration would result in a financial benefit for the hospital if patients would bring their own medication from home into the hospital. No consensus between healthcare providers on self-administration resulting in an increased healthcare providers' knowledge due to the related communication was observed. Nurses tended to agree this statement (67.1%), in comparison to hospital pharmacist and physicians opinion being almost equally divided (respectively 57.6% and 49.3%, $p = .035$).

Prerequisites for self-administration of medication (n= 271)	Important*	Not important*	p-value ¹
1 The patient will return back home after discharge	71.6	28.4	
Nurses	68.9	31.1	
Physicians	73.8	26.2	.420
Hospital pharmacists	79.4	20.6	
2 The patient already self-administered medication at home	85.2	14.8	
Nurses	81.5	18.5	
Physicians	90.8	9.2	.120
Hospital pharmacists	91.2	8.8	
3 The patient is motivated to take medication correctly	98.4	1.6	
Nurses	99.3	0.7	
Physicians	96.9	3.1	.344
Hospital pharmacists	97.1	2.9	
4 The patients' home medication schedule will not be changed during hospitalization	50.4	49.6	
Nurses	49.0	51.0	
Physicians	49.2	50.8	.572
Hospital pharmacists	58.8	41.2	
5 During hospitalization, the patient receives exactly the same brand of medication	65.2	34.8	
Nurses	72.8	27.2	
Physicians	63.1	36.9	<.001
Hospital pharmacists	35.3	64.7	
6 The self-administered medication can be locked up safely on the patient's room	59.6	40.4	
Nurses	53.0	47.0	
Physicians	64.6	35.4	.011
Hospital pharmacists	79.4	20.6	
7 Medication reconciliation has to be provided	97.2	2.8	
Nurses	97.4	2.6	
Physicians	95.4	4.6	.411
Hospital pharmacists	100.0	0.0	
8 The patient will not receive both self-administered and nurse administered medication	25.2	74.8	
Nurses	24.5	75.5	
Physicians	30.8	69.2	.343
Hospital pharmacists	17.6	82.4	
9 The hospital pharmacy should deliver the patient's home medicines	77.6	22.4	
Nurses	84.1	15.9	
Physicians	69.2	30.8	.008
Hospital pharmacists	64.7	35.3	
10 During the hospital stay, the patient's competences for self-administration will be evaluated on a regular basis	98.0	2.0	
Nurses	99.3	0.7	
Physicians	93.8	6.2	.020
Hospital pharmacists	100.0	0.0	
11 The reason for the hospital admission is not linked to the home medicines	58.0	42.0	
Nurses	55.6	44.4	
Physicians	63.1	36.9	.593
Hospital pharmacists	58.8	41.2	

* Not important: sum of % healthcare providers who indicated absolutely/rather not important; Important: sum of % healthcare providers who indicated rather/very important

¹Differences between healthcare providers was calculated with the use of the Chi Square test.

Table 23. Prerequisites for self-administration of medication

Consequences of self-administration of medication (n= 258)	Agree*	Disagree*	p-value
1 Patients will take their medication more correctly compared to medication administration performed by nurses	63.2	36.8	
Nurses	67.8	32.2	
Physicians	50.7	49.3	.032
Hospital pharmacists	69.7	30.3	
2 The patient will gain knowledge because of the support of healthcare professionals	82.2	7.8	
Nurses	94.7	5.3	
Physicians	86.6	13.4	.080
Hospital pharmacists	93.9	6.1	
3 Patients will feel more autonomous and more independent during hospitalization	92.6	7.4	
Nurses	96.1	3.9	
Physicians	82.2	17.8	<.001
Hospital pharmacists	100.0	0.0	
4 Patients will be more satisfied with their hospital stay	74.4	25.6	
Nurses	78.9	21.1	
Physicians	65.8	34.2	.102
Hospital pharmacists	72.7	27.3	
5 Patients will adhere better to their medication after discharge	82.6	17.4	
Nurses	84.9	15.1	
Physicians	72.6	27.4	.014
Hospital pharmacists	93.9	6.1	
6 The safety of fellow patients will not be jeopardized	55.4	44.6	
Nurses	54.6	45.4	
Physicians	53.4	46.6	.589
Hospital pharmacists	63.6	36.4	
7 The patients' own safety will increase	54.7	45.3	
Nurses	59.2	40.8	
Physicians	45.2	54.8	.142
Hospital pharmacists	54.5	45.5	
8 There will be a financial benefit for patients who bring their medication from home into the hospital	30.6	69.4	
Nurses	33.6	66.4	
Physicians	31.5	68.5	.113
Hospital pharmacists	15.2	84.8	
9 The healthcare providers' knowledge will increase due to the communication concerning self-administration of medication	60.9	39.1	
Nurses	67.1	32.9	
Physicians	49.3	50.7	.035
Hospital pharmacists	57.6	42.4	
10 The workload for healthcare providers will decrease	44.6	55.4	
Nurses	41.4	58.6	
Physicians	52.1	47.9	.314
Hospital pharmacists	42.4	57.6	
11 There will be a financial benefit for the hospital if patients bring their medication from home into the hospital	66.7	33.3	
Nurses	64.5	35.5	
Physicians	65.8	34.2	.281
Hospital pharmacists	78.8	21.2	
12 There will be a decrease in time investment on medication management (prescribing medication, preparing medication, reviewing medication and administering medication)	58.1	41.9	
Nurses	58.6	41.4	
Physicians	60.3	39.7	.690
Hospital pharmacists	51.5	48.5	

* Disagree: sum of % healthcare providers who indicated strongly disagree and disagree; Agree: sum of % healthcare providers who indicated agree and strongly agree. ¹Chi Square

Table 24. Consequences of self-administration of medication

6.3.7 Supportive measures for self-administration of medication

Healthcare providers were questioned on supportive measures in order to support the facilitation of self-administration of medication in hospital. All supportive measures provided in the questionnaire were deemed necessary, as shown in Table 25. Overall, healthcare providers deemed the SelfMED control least important, and both the SelfMED assessment and support as most important.

Required supportive measures for self-administration of medication concerning healthcare providers*¹ (%)
n= 254

SelfMED control	62.6
SelfMED protocol	68.1
SelfMED assessment	70.1
SelfMED support	71.7
Other measure	7.1

* Multiple answers were allowed.

¹SelfMED control: an instrument for healthcare providers to monitor self-administration of medication.

SelfMED assessment: an instrument for healthcare providers to evaluate the patients' competences for self-administration of medication.

SelfMED support: an instrument for patients to provide them with information and support them during self-administration.

SelfMED protocol: a protocol to support healthcare providers (physicians, nurses, hospital pharmacists) during the facilitation of self-administration.

Other measure: free text was invited, no prominent notes were identified.

Table 25. Supportive measures for self-administration of medication

6.3.8 Patients competences for self-administration of medication

A set of 17 competences, which could be assessed in order to determine whether patients are capable for self-administration of medication, were provided. Healthcare providers were asked to check off which ones they deemed important (see Table 26).

Except for the need of assessing the patients' ability to name side effects of medication, whether they already self-administered medication during previous hospital admissions, assessing the patients' history of medication abuse or assessing their ability to ask supplementary medication, or their use of a memory aid for medication management, the majority of competences was stated as important.

Competences for self-administration (n= 254)	%
1 The patient's ability to name side effects	33,1
2 Self-administration of medication during previous hospitalizations	42,9
3 The patient's history of medication abuse	54,3
4 The patient's ability to ask supplementary medication (e.g. pain medication)	58,7
5 The patient's ability to use of a memory aid for medication management	59,4
6 The patient's ability to describe his/her own home medicines schedule	66,1
7 The patient's ability to report his/her own needs to a healthcare professional	68,1
8 The patient's ability to take medication out of a blister	69,3
9 The patient's ability to identify him/herself	72,4
10 The patient's ability to know the indication of their medicines	72,8
11 The patient's ability to verbally communicate with healthcare professionals	73,2
12 The patient's ability to orientate to place	74,4
13 The patient's willingness to self-administer	81,1
14 The patient's ability to orientate to time	81,5
15 The patient's ability to recall his/her last administered medicine	83,5
16 The patient's medication management at home	84,3
17 The patient's ability to adhere to the therapy	86,2

Table 26. Competences for self-administration of medication

6.4 Discussion

During this study the willingness to let patients self-administer their medication, the attitude towards it, prerequisites and perceived consequences of self-administration of medication in hospital concerning nurses, physicians and hospital pharmacist were questioned. By including all stakeholders, this study provided valuable insights.

6.4.1 Healthcare providers' willingness and attitude

The study findings on the willingness and attitude towards self-administration confirmed healthcare providers' positive attitude and willingness (Richardson et al., 2014; Vanwesemael, Boussery, Manias, et al., 2018). It was noted nurses and hospital pharmacists were generally more willing and had a more positive attitude towards self-administration of medication in hospital compared to physicians. This less positive attitude was already been observed in our prior qualitative research. Physicians described the majority of risks related to self-administration of medication in hospital (Vanwesemael, Boussery, Manias, et al., 2018). It should be taken into account physicians are possibly less willing to implement self-administration of medication in daily practice. Interventions to make sure physicians – and all involved healthcare providers - are willing to facilitate self-administration and assist this should be installed. These interventions should for example include a clear description on the engagement of the physician within the goal of facilitating self-administration, should describe the shared purposes within this new approach, and should highlight the added value for physicians (Gupta, Boland, & Aron, 2017).

A significant difference between physicians, and nurses and hospital pharmacists concerned the ability of the healthcare provider being able to define the patient's capability for self-administration of medication on his/her own. Over half of the physicians were certain about being able to judge on their own whether a patient is capable to self-administer medication. This was in contrast to only one out of five nurses or hospital pharmacists who deemed themselves capable of doing this alone. Literature on explaining this difference was not found. It is suggested to further explore possible reasons for this

finding as this might impede facilitation of self-administration of medication. From our point of view self-administration of medication benefits from a multidisciplinary approach in which every healthcare provider can contribute from their own competence. For example, hospital pharmacists have an important role in medication provision and medication reconciliation in hospital and should therefore be involved during self-administration of medication ("Royal decree setting out the standards which hospital pharmacies must meet to be authorized," 1991; Vanwesemael, Boussery, Manias, et al., 2018; Vanwesemael et al., 2017).

In this study, hospital pharmacists deemed their role during the decision making on allowing or declining patients to self-administer as obvious, nevertheless nurses and physicians did not as much agree on this statement. Recent evidence indicated hospital pharmacists are currently seldom involved in medication self-administration in daily practice (Vanwesemael et al., 2017).

6.4.2 Self-administration of medication in daily practice

This study identified important prerequisites for self-administration of medication in hospital. Generally, they concerned aspects directly related to the patient and aspects related to the facilitation of self-administration. Supplementary, this study gained information on the needs of healthcare providers concerning supportive measures for actually facilitating self-administration in daily practice (SelfMED assessment, SelfMED control, SelfMED support and the SelfMED protocol) and the evaluation of required patient competences for self-administration (SelfMED assessment).

We do recommend further research on important prerequisites for self-administration. For example, identifying whether it is essential or not the patient receives the exact same brand during self-administration of medication in hospital, evaluating the possibility of using the patient's own medicines (PODs), the influence of storing self-administered medicines in closed lockers or in the patient's bedside locker, and to which degree patients can adapt to changes in the self-administered medicines schedule without impacting patient safety.

6.4.3 Consequences of self-administration of medication

Healthcare providers in this study were positive about the consequences of self-administration of medication for patients. For example, patient's knowledge would increase, they would be more satisfied and self-administration would result in better therapy adherence after discharge. When comparing these findings with two systematic reviews on the topic of self-administration of medication, it is possible to draw some conclusions. Literature on the patient's knowledge indicated self-administration does increase knowledge, nevertheless it is not clear which aspects significantly improve (e.g. knowledge on drug name, purpose, dosage...). Also, previous studies tended to use different types of education, therefore results should be interpreted cautiously (Richardson et al., 2014). Several contradictory findings were reported in literature on the effect of self-administration on patient satisfaction (Richardson et al., 2014; Wright et al., 2006). Most recent Belgian study on the perception of 124 hospitalized patients indicated 62.4% stated self-administration of medication would make them more satisfied about their hospital stay (Vanwesemael, Boussery, van den Bemt, & Dilles, 2018). Evidence on the effect of self-administration on therapy adherence after discharge was found to be very ambiguous (Wright et al., 2006).

Consequences that related to healthcare providers or the hospital were also evaluated in this study. Healthcare providers anticipated self-administration would result in a financial benefit for the hospital if patients would bring their own medication from home into the hospital. This approach, 'PODs, patients' own drugs' was already described in a study by McLeod et al (McLeod, Ahmed, Barber, & Franklin, 2014). However, this approach is not allowed within the current Belgian regulation, as

medicines should always be distributed by the hospital pharmacy ("Royal decree setting out the standards which hospital pharmacies must meet to be authorized," 1991). Based on the study results, it is not clear whether self-administration would lead to an increased healthcare providers' knowledge due to the related communication, or a decreased workload and a decreased time investment on medication management. Literature on these topics indicated self-administration results in benefits concerning multidisciplinary communication (Richardson et al., 2014). Yet, whether knowledge would increase should be further evaluated. The actual effect of self-administration in daily practice on time investment and workload has not been studied heretofore (Richardson et al., 2014).

In conclusion, it is possible to state a large number of the included articles in the systematic reviews by Richardson et al and Wright et al on the effects of self-administration lack rigor, have methodological flaws, or results contradict each other. Also, the number of recent studies on this topic are very limited (Richardson et al., 2014; Wright et al., 2006). Therefore, it is advised to further evaluate whether abovementioned consequences actually appear during self-administration in daily practice. Future randomized controlled trials should focus on aspects such as patient and staff satisfaction, medication knowledge, patient autonomy and satisfaction, therapy adherence (with providing a long-term follow up, even after discharge), and the impact on time investment and workload compared to nurse-administered medication.

6.4.4 Strengths and limitations

A strength of this study was the inclusion of all important involved healthcare providers for self-administration of medication. Due to the construct of data collection, several institutions and organizations were involved resulting in healthcare providers with different work environments and a broad range of work experience. Nevertheless, it is possible respondents with a more explicit opinion on self-administration of medication were more likely to have completed the questionnaire. It was not possible to provide a calculation of the response rate, because of the digital distribution of the questionnaire. The absence of selection bias can not be guaranteed.

During this study, perceptions of different stakeholders were questioned. The study results are essential in order to develop a self-administration of medication procedure. In order to evaluate the actual impact of a self-administration of medication procedure on the patient, healthcare providers and the organization related outcomes in daily practice, a RCT should be installed.

6.5 Conclusion

Nurses and hospital pharmacists were very willing and physicians were willing to let patients self-administer their medication during a hospital stay. They stated self-administration of medication could result in several positive patient related and staff related outcomes. Nevertheless, in order to facilitate self-administration of medication in hospital important requisites were defined. Future research should focus on developing an evidence-based procedure for facilitating self-administration of medication in hospital and consequences in daily practice should be further evaluated.

6.6 References

- Deeks, P. A., & Byatt, K. (2000). Are patients who self-administer their medicines in hospital more satisfied with their care? *J Adv Nurs*, 31(2), 395-400.
- Gupta, D. M., Boland, R. J., Jr., & Aron, D. C. (2017). The physician's experience of changing clinical practice: a struggle to unlearn. *Implement Sci*, 12(1), 28. doi:10.1186/s13012-017-0555-2
- Manias, E., Beanland, C., Riley, R., & Baker, L. (2004). Self-administration of medication in hospital: patients' perspectives. *J Adv Nurs*, 46(2), 194-203. doi:10.1111/j.1365-2648.2003.02979.x
- McLeod, M., Ahmed, Z., Barber, N., & Franklin, B. D. (2014). A national survey of inpatient medication systems in English NHS hospitals. *BMC Health Serv Res*, 14, 93. doi:10.1186/1472-6963-14-93
- Richardson, S. J., Brooks, H. L., Bramley, G., & Coleman, J. J. (2014). Evaluating the effectiveness of self-administration of medication (SAM) schemes in the hospital setting: a systematic review of the literature. *PLoS One*, 9(12), e113912. doi:10.1371/journal.pone.0113912
- Royal decree setting out the standards which hospital pharmacies must meet to be authorized, §§ 9°4 C.F.R. (1991).
- Vanwesemael, T., Boussery, K., Manias, E., Petrovic, M., Fraeyman, J., & Dilles, T. (2018). Self-management of medication during hospitalisation: Healthcare providers' and patients' perspectives. *J Clin Nurs*, 27(3-4), 753-768. doi:10.1111/jocn.14084
- Vanwesemael, T., Boussery, K., van den Bemt, P., & Dilles, T. (2018). The willingness and attitude of patients towards self-administration of medication in hospital. *Ther Adv Drug Saf*, 9(6), 309-321. doi:10.1177/2042098618764536
- Vanwesemael, T., Van Rompaey, B., Petrovic, M., Boussery, K., & Dilles, T. (2017). SelfMED: Self-Administration of Medication in Hospital: A Prevalence Study in Flanders, Belgium. *J Nurs Scholarsh*, 49(3), 277-285. doi:10.1111/jnu.12290
- Wright, J., Emerson, A., Stephens, M., & Lennan, E. (2006). Hospital inpatient self-administration of medicine programmes: a critical literature review. *Pharm World Sci*, 28(3), 140-151. doi:10.1007/s11096-006-9014-x



Chapter 7

An evidence-based procedure for self-management of medication in hospital:
development and validation of the SelfMED procedure

Outline

7	An evidence-based procedure for self-management of medication in hospital: development and validation of the SelfMED procedure	113
7.1	Abstract	113
7.2	Introduction	114
7.3	Materials and methods	115
7.3.1	Stage 1: Development of procedure	115
7.3.2	Stage 2: Validation	116
7.3.3	Study methodology	117
7.3.4	Translation	117
7.4	Results	117
7.4.1	Stage 1: Development	117
7.4.2	Stage 2: Validation	119
7.5	Discussion	120
7.5.1	The SelfMED procedure in daily practice	121
7.5.2	Implications for research	121
7.6	Conclusions	122
7.7	Supplementary materials	122
7.8	Author contributions	122
7.9	Funding	122
7.10	Acknowledgments	122
7.11	Conflicts of interest	123
7.12	References	123

7 An evidence-based procedure for self-management of medication in hospital: development and validation of the SelfMED procedure

This chapter has been published as:

Vanwesemael, T.; Dilles, T.; Van Rompaey, B.; Boussey, K. An Evidence-Based Procedure for Self-Management of Medication in Hospital: Development and Validation of the SelfMED Procedure. Pharmacy (Basel), 2018, 6 (3), 77.

7.1 Abstract

Aim

To develop and validate a procedure for self-management of medication by patients whilst in hospital.

Background

Self-management of medication allows patients to self-manage their medication in a controlled and supportive hospital environment. This practice is encouraged worldwide, yet an evidence-based procedure to evaluate the ability of patients to self-manage and to monitor and support self-management are absent.

Methods

The evidence-based procedure for self-management of medication (SelfMED) was developed based on previous conducted qualitative research, literature review, and the current regulation. It was validated by healthcare providers and a multidisciplinary expert meeting. Questions within the procedure that could be biased were tested for inter-rater reliability.

Results

First, the SelfMED procedure was developed. It consists of a stepped assessment of patient's competencies for self-management performed by healthcare providers and the patient. When self-management is allowed, the SelfMED monitoring tool monitors the patient's intake of self-managed medication. Secondly, the procedure was revised for clarity, appropriateness, and face validity by five healthcare providers and a multidisciplinary expert meeting, resulting in the final version. Thirdly, three questions from the final version were tested for interrater reliability. Cohen's Kappa showed moderate to strong levels of agreement.

Conclusions

The developed SelfMED procedure provides an evidence based approach of facilitating self-management of medication. The content of the procedure was found valid to evaluate the patient's ability to self-manage and to monitor them while self-managing.

Keywords

hospital medicine; medication management; medication self-management; inpatients

7.2 Introduction

Patients self-administering their medication while hospitalized has been mentioned in literature as far back as 1959 [1]. Previous research established self-administration of medication has been implemented in acute hospitals in the United Kingdom. Nevertheless, the levels of implementation remained variable [2,3]. The Society of Hospital Pharmacists of Australia, described self-management as a strategy to evaluate the medication management of hospitalized patients in order to prevent medication related problems after discharge. Facilitating self-administration in a supervised setting and combined with support could result in confident and competent patients. The Society describes self-administration in hospitals as an important contribution to a return to independent living at home after discharge [4]. Belgian research on the actual prevalence showed 22% of hospitalized patients did self-administer medication. Concerning the opinion of nurses on the ability of these hospitalized patients to prepare and administer medication by themselves, just 40.9% of the patients were deemed able to do so. The decision of allowing self-administration was mostly a shared process between patients and healthcare providers. In 28.3% the patient, nurse, and treating physician were involved and in 26.3% the nurse and the patient [5]. Overall, it is possible to conclude self-management is not an unusual practice and it has been studied and implemented worldwide [4,6,7,8].

Although, self-administration of medication is implemented in practice, a rigorous study on 56 Flemish nonacute hospital wards showed some clear shortcomings. Only 17.9% of the included wards had a procedure for self-administration of medication and 7.1% of the wards had a screening tool to assess patients on their self-management ability before allowing them to self-administer [5]. A qualitative study on the perspectives of healthcare providers and patients concerning self-administration of medication during hospitalization acknowledged these findings. The interviewed respondents indicated it is not clear how to identify whether a patient is able to self-administer medication or not. Also, healthcare providers and patients worried about how to monitor self-administered medication correctly, as there was no guideline to support this act. Respondents in this study were not up to date on the current legislation or regulation concerning self-administration of medication and were very insecure on how to handle this in practice [9].

Self-administration of medication, as described in the literature, focuses on the actual administration of medication. However, allowing self-administration of medication by patients whilst in hospital requires adjustments in general medication management (e.g., preference for the use of unit dose medication and providing patient education on self-administered medication). Therefore, the term self-management of medication is preferred. This term includes both medication administration and aspects of medication management such as monitoring self-administration, providing education on self-administered medication by healthcare providers, and the support of every stakeholder in the process in order to succeed in self-managing medication [5,6,9]. Two systematic reviews on self-management of medication confirmed the presence of very diversely structured self-management programs (SMP's), with different contents. Although, several SMP's have been designed in studies, very little have been thoroughly validated and tested [6,7].

As previous research showed, a self-management of medication procedure should include an assessment in order to define whether a patient is capable of self-managing medication. If a patient is deemed capable, a monitoring tool should support self-management to be safe and all aspects on the current regulation should be clear in order to adhere to [5,9].

A literature search on assessments in order to define whether a patient is capable of self-managing medication identified two articles on the validation of a self-administration of medication (SAM) screening tool in order to define the patient's competencies. The SAM screening tool consisted of two

parts. The first part had to be answered by the patient and was filled in by an administrator. The patient's desire to self-manage was evaluated with the use of a visual analog scale. This scale questioned the patient (1) whether he/she deems him/herself competent for managing regular medication independently while in hospital and (2) how much he/she would like to manage these regular medications while in hospital. Also, demographic data on the patient's discharge destination and responsibility for medication management following discharge was collected. The second part had to be filled in by the nurses if the patient was willing to self-manage. It consisted of questions on the patient's capability to self-medicate (11 questions), knowledge of medications and behavior (7 questions), and experience with self-medicating (6 questions). In the end, the nurse needed to make a global assessment with the use of a visual analog scale, resulting in a maximum score of 96 points. The cut-off was installed at 60, below this cut-off patients were not able to self-manage medication [8,10]. Specific literature concerning the validation of a monitoring tool to follow up self-administration are still lacking, although the systematic review written by Wright et al. indicated nurses monitored the intake of self-administered medication. Yet, monitoring in these studies was part of collecting the outcome (adherence), not a way of observing and monitoring self-management [6,7].

Results from previously conducted research provided some evidence on the content of a procedure for self-management of medication in hospitals. Nevertheless, they revealed some important issues not included in the previous tools. First, there is a need for a multidisciplinary approach; hospital pharmacists, physicians, nurses, and patients have their own responsibilities and should therefore be included in the process of evaluating competencies for self-management [11]. Secondly, this multidisciplinary approach should be included in a much-needed assessment which clarifies and takes into account the current legal framework on self-management in hospitals. Thirdly, an instrument for monitoring self-management should be provided within the procedure of self-management. Therefore, this study aimed to develop and validate a procedure for self-management of medication whilst in hospital, also named the SelfMED procedure.

7.3 Materials and methods

During the first stage of this study a procedure for self-management of medication was developed. During the second stage, it was validated with the involvement of several healthcare providers and a multidisciplinary expert meeting. Questions in the assessment that could be biased by the opinion of nurses were tested for inter-rater reliability. The study was conducted in accordance with the Declaration of Helsinki, approval of the ethics committee of the general hospital Klina was provided on 19 November 2015, reference number 031/200/015.

7.3.1 Stage 1: Development of procedure

During the first stage of developing the SelfMED procedure several actions were undertaken. As shown in Figure A1, a previously conducted qualitative study on the perspectives of patients, nurses, physicians, and hospital pharmacists concerning the strengths, weaknesses, opportunities, and threats of self-management of medication during hospitalization was used. Study results indicated both healthcare providers and patients stated important prerequisites in order to facilitate self-management of medication in hospital. Analysis of these results allowed the authors to allocate these prerequisites to three major topics; prerequisites related to the patient, the medication, and the organization. Those related to the patient were; e.g., patients had to be self-managing medication at home before hospitalization, they had to be willing to self-manage medication, and had to be able—mentally and physically—to self-manage medication. Those related to the medication were; e.g., self-managed medication should not consist of too many different types of medication. Those related to the organization were; e.g., provide a clear legal context with defined responsibilities in case of self-

management, and a system to monitor medication self-management [9]. Secondly, literature on medication adherence and validated tools to assess patient's competencies to self-manage were supplementary examined and compared to the findings of the qualitative research. Also, the Morisky Medication Adherence Scale was consulted [8,9,10,12]. Thirdly, it was important to adhere current regulation concerning medication self-management in Belgian hospitals. Therefore, the Care inspection of the Flemish division of Wellbeing, Public Health, and Family was consulted. Self-management of medication is allowed in hospitals if the self-managed medication is registered in the patient's personal medical file. During this process, healthcare providers maintain their duty of care and their duty of surveillance, while the treating physician takes responsibility for allowing and evaluating self-management of medication (Care inspection of the Flemish division of Wellbeing, Public Health, and Family, personal communication, October 2015). Because of the current regulation on self-management, the developed SelfMED procedure clearly stated self-managed medication had to be noted down in the patient's medical file. Also, the SelfMED monitoring tool—a part of the SelfMED procedure—facilitated the duty of surveillance and care, and the overall evaluation of self-management. In the end, the described role of treating physician in the procedure indicated he/she has the final decision on allowing or declining self-management and the type of self-managed medication.

7.3.2 Stage 2: Validation

The first draft of the SelfMED procedure was validated in several phases (see Figure A1, appendix IV), by three pharmacists, a physician, and a nurse manager who were employed in both university and regional hospitals. They were selected based on their knowledge of hospital medication management, tool development, and their role in direct patient care.

The first draft was evaluated on clarity, appropriateness, and face validity. Face validity measured the degree to which the included questions measured what they were supposed to [13,14]. Also, the clarity and wording were evaluated during this process. In addition, the healthcare providers assessed the importance attached to the content of the questions and the appropriateness of the response scale used. The format and the overall presentation of the SelfMED procedure was evaluated. After the evaluation, adjustments were made based on the feedback; fewer answer categories were provided and questions were reformulated in order to avoid jargon in the patient's self-assessment. The monitoring tool for self-managed medication was adjusted in order to make it easier to use and a clear description was provided to support completing the form correctly.

The second draft of the SelfMED procedure was discussed in a multidisciplinary expert meeting. The expert meeting consisted of nurses (n = 3), a nurse manager (n = 1), physicians (n = 2), and a hospital pharmacist (n = 1) from a regional hospital. They were selected based on their knowledge on hospital medication management in daily practice, as stakeholders who would use the procedure in daily practice. Again, a revision for clarity, appropriateness, and the format and overall presentation was conducted. Some minor alterations were made after this expert meeting; the lay-out was simplified and adjusted in order to facilitate the use of a paper-based SelfMED procedure, the actual number of days a patient needed to be hospitalized in order to assess his/her ability to self-manage was deleted, the order of the first two statements of the nurse assessment was changed, the provided description on how to use the monitoring tool was rewritten more concisely.

A part of the SelfMED procedure consisted of an assessment that questioned the opinion of a nurse on the capabilities of hospitalized patients to self-manage their medication. Three statements concerned the mental and physical state of the patient, and one the capability to deal with changes in

the medication regimen. As these questions may be biased by the nurse assessing the patient, two nurses independently assessed patients.

7.3.3 Study methodology

The study on evaluating bias took place in a regional hospital, on a cardiology ward specialized in heart failure, cardio revalidation, and postinterventional care. Two nurses agreed on assessing the patients, both nurses were working on the participating ward. All consecutive patients on the ward were eligible to participate if over the age of 18 years old. All subjects received oral and written information about the study and who—with the use of the nurse's assessment—assessed their competence for self-management of medication in hospital. Also, the nurse's assessment evaluated whether patients had to be taking medication in hospital, if not they could not participate the study. All patients gave their informed consent for inclusion before they participated in the study. Data collection was performed from February until March 2016. During the completion of the assessment there was no contact between the assessing nurses. Both conducted their assessment one after the other, in order to rule out possible changes in the health status of the patients. Afterwards the inter-rater reliability was calculated by the Cohen's Kappa, this resulted in the percentage agreement between both nurses [15,16,17,18]. The Statistical Package for Social Sciences (SPSS) version 24.0 (SPSS Inc., Chicago, IL, USA) was used to analyze the 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. A p value of 0.05 was considered as statistically significant.

7.3.4 Translation

For publication purposes a forward-translation from the Dutch version of the SelfMED procedure to English was performed. Two translators independently performed their translations, one translator was a native English speaker the other was perfect bilingual. None of them were previously involved in this study, yet they did have knowledge concerning medication management, healthcare, and hospital care. After translating, both translators discussed their translations and resolved some differences. Then, the English version of the SelfMED procedure was back-translated by an independent translator with an academic background and a level five (C1) in English concerning the Common European Framework of Reference. This translator was bilingual and has not been involved in this, nor previous studies concerning this topic. Back-translation revealed some minor unclear wordings; these were adapted in the English version [16].

7.4 Results

7.4.1 Stage 1: Development

The SelfMED procedure in this study was developed through several stages (see Figure A1, appendix IV). As a result of this process, the SelfMED procedure consists of several phases, each described in following sections (see Figure A2, appendix IV). The complete SelfMED procedure can be consulted in Figure A3 (appendix IV).

7.4.1.1 *Nurse assessment*

A ten-statement assessment allows the nurse to assess the eligibility of the patients for self-management of medication. Filling out this assessment can be done based on the information which is obtained during the intake and information available in the patient's medical file. Nurses are able to define an answer to the statement in the first column (agree/not agree/not known) and assess whether the statements are a barrier for self-management in the second column (barrier for self-

management/possible barrier for self-management/no barrier for self-management). At the end of the assessment the nurse indicates whether the patient is eligible for self-management, if so the patient needs to further fill out the patient self-assessment.

7.4.1.2 Patient self-assessment

If the nurse deems the patient capable of self-managing medications, the next phase of the procedure consists of a patient questionnaire. The patient should complete this self-assessment on their own. The questions in the assessment consist of: the current medication management at home (one item), the patient's willingness to self-manage medication in hospital (one item), a possible need for aide while self-managing in hospital (one item), and the patient's therapy adherence out of hospital (seven items). If a patient indicates he/she is not self-managing medication at home or is not willing to self-manage medication, he/she does not have to complete the questionnaire.

The information from both the nurse's assessment and the self-assessment enables nurses to formulate advice for the treating physician to allow or decline self-management of medication. If patients are willing to self-manage medication, nurses can further interpret the results of the resulting questions concerning the patient's medication management at home and their medication adherence. Because of the active involvement of the patient during the assessment, it is possible to also test the patient's fine motor skills. These skills are of great importance in, for example, opening medication blisters or checking off the medication list of self-managed medication.

If the nurse formulates negative advice, there is a possibility to advise a reassessment at another moment in time. Improvement in health status can result in improvements in self-management competence.

7.4.1.3 Physician assessment

In the next phase, the patient's physician can make a final decision on allowing the patient to self-manage medication. The advice formulated by the nurse, the nurse's assessment, and the patient's self-assessment are available to make an informed decision. If the treating physician decides it is not allowed to self-manage medication, there was a possibility to re-assess the patient at another moment in time. If a patient is judged to be eligible and self-management is allowed, the actual self-managed medicines need to be specified by the treating physician and registered in the patient's personal medical file. A clinical pharmacist can be involved to provide supplementary comments if they are involved in the medication process.

7.4.1.4 Practical issues for starting self-management of medication

If a patient is capable of self-managing medication, several practical arrangements have to be made: provide the patient with a medication list on his medication, provide correct medication to the patient room, and document the self-managed medication in the patient's medical file. Also, patients need to be educated on the monitoring system.

7.4.1.5 Monitoring self-management of medication

Self-managing patients are instructed on the use of the monitoring tool. They are aware of the type of medication, the time when to take medication, and the dosage. If the self-managed medication has been taken, patients are asked to check off these medicines on the hour of intake on their medication list. On a daily basis—during medication administration tours—the list with self-managed medication has to be checked for mistakes by the nurse. If problems concerning medication self-management occur, there is doubt about medication intake, or for research purposes, a pill count can be provided optionally in order to detect medication errors.

The monitoring tool consists of a first column to define the date and the second shows the initials of the monitoring nurses that day. The third and fourth column questions whether the patient is still capable to self-manage medication, if not the reason should be formulated (e.g., sudden illness, mental decline). If the status of the patient has not changed and he/she was self-managing medication, the medication list is then evaluated and a pill count is optionally performed. The results should be noted in the monitoring file on the patient's room. If the patient succeeds in every aspect of self-management, self-management can be continued. If patients fail in self-managing their medication, the nurse can intervene by providing patient education to prevent this error from occurring again. If the errors in the self-management are found to be problematic, it is possible to stop self-management. In case a patient is not capable of self-managing medication, self-management stops. A possibility to reassess over a period of time is provided.

7.4.2 Stage 2: Validation

Question four, five, and seven in the nurse's assessment may be biased by the rater (see section Nurse assessment Figure A3). Therefore, the kappa statistic was used to test inter-rater reliability [14]. A total of 158 hospitalized patients were assessed by two raters. Table 27 gave an insight in the demographics of the assessed patient population. Only, if the assessing nurse deemed patients capable, they completed the self-assessment. Therefore, only data from these patients on the level of education, chronic medication intake at home, and self-management of medication during previous admissions were collected and showed in Table 27. As shown in Table 28 all three questions had moderate to strong levels of agreement between both raters (n = 158, question 4 κ 0.892, question 5 κ 0.843, question 7 κ 0.784; $p < 0.001$).

Patient characteristics	n	%
Age (yr, mean [range])	158	72.8 [23-95]
Sex	158	
Male		47.5
Female		52.5
Level of education	73	
None		12.3
Primary school		17.8
Secondary school		52.1
Bachelor		15.1
Master		2.7
Chronic medication intake at home (mean [range])	71	4.7 [0-15]
Self-management of medication during previous admissions	74	
Yes		74.3
No		25.7

Table 27. Demographics

		Opinion nurse 2 (n)			Kappa p value
		Not agree	Agree	Unknown	
The patient is physically able to self-manage his medication (n= 159)	Opinion nurse 1 (n)				
	Not agree	33	0	0	.892 <.001
	Agree	6	120	0	
Unknown	0	0	0		
The patient is mentally able to self-manage his medication (n= 159)	Not agree	46	1	0	.843 <.001
	Agree	10	102	0	
	Unknown	0	0	0	
The expectation is that the patient can handle possible treatment changes (n= 159)	Not agree	47	3	0	.784 <.001
	Agree	10	96	0	
	Unknown	3	0	0	

Table 28. The inter-rater reliability of three question from the nurse's assessment

7.5 Discussion

In this study the SelfMED procedure was developed. This procedure guides and supports patients and healthcare providers during the decision-making process concerning allowing or declining self-management and during actual self-management of medication. During the development, the opinion of, not only nurses and patients, but also hospital pharmacists and physicians and the current regulation on self-management in hospitals were taken into account. Therefore, all these important stakeholders were included in the procedure.

The SelfMED procedure consists of a stepped assessment performed by the nurse (1), the patient (2), and the hospital pharmacist and treating physician (3). This assessment enables the treating physician to provide a well-informed decision on allowing or declining a patient to self-manage medication in hospital. If a patient is allowed, the SelfMED monitoring tool will monitor the intake of self-managed medication and detect possible medication errors or other medication related problems. If problems occur, the SelfMED procedure encourages interventions such as patient education to provide them from reoccurring. The procedure distinguishes itself from previously developed tools, as it includes all important stakeholders and adheres to current regulation. Furthermore, it not only assesses patient's competencies but also guides and supports monitoring self-management and encourages healthcare providers to improve the patient's self-management skills if necessary [6,7,10].

The role of hospital pharmacists was briefly described in the assessment phase. Nevertheless, their involvement is foremost important. As described in literature, the active involvement of hospital pharmacists on clinical wards resulted in several benefits such as improved care and reduced harm [19]. Specifically, for self-management of medication in hospital, hospital pharmacists can provide counseling sessions for patients when problems arise concerning adherence that occurs during self-management, and they can support nurses in educating patients on medication. Also, pharmacists can clarify discharge prescriptions, as literature indicated this as a problem for patients [20]. Research on hospital pharmacists providing patient counseling before hospital discharge and telephone follow up after discharge indicated a significant association with less adverse drug events [21]. These findings strengthen the hospital pharmacists' important role.

7.5.1 The SelfMED procedure in daily practice

Previous literature on self-management of medication indicated possible advantages such as; increased patient satisfaction, increased patient safety, an improvement of adherence to pharmacotherapy, and self-care competence [5,6,9,22]. Research on the willingness of patients highlighted they were generally very willing to self-manage medication in hospital. Nevertheless, if patients do not want to self-manage medication this should be respected [22].

Notwithstanding the possible advantages of self-management of medication, actually implementing the SelfMED procedure requires some changes in the current medication management process. Compared to nurses preparing and administering medication, self-management implicates patients have to be assessed first to determine their competence for self-management. Additionally, self-managed medication is ideally supplied as unit dose and logistics on how to transport medication to the patient room and store it should be apparent. Previous research already provided a flowchart on these advised adaptations [9]. Secondly, problems on medication shortages might influence the delivery of self-managed medication, as the medicines might not be in stock [23].

Also, adaptations on ward-level are advisable. As stated in the procedure, the storage of self-managed medication in closed lockers or the patient's personal locker is advised. It is possible not all patient rooms have access to a personal locker. Nevertheless, nightstands mostly tend to have a built-in locker. Also, when self-managing patients check off their medication list, as stated in the SelfMED procedure, nurses are not possible to observe this other than checking the actual medication list on the patient's room. It would be an added value if this medication list could be provided on a tablet or linked to an electronic patient data management system. Additionally, this can also provide nurses with an overview on self-managed and nurse administered medication.

7.5.2 Implications for research

The SelfMED procedure developed and validated in this study provides a first evidence-based guide for self-management of medication. In order to refine and provide further improvements, following implications for research were discussed.

The current SelfMED assessment comprised a stepped approach with a limited amount of questions for nurses, patients, and physicians. It is expected that due to this approach the time investment for completing the assessment remains limited for each stakeholder. Supplementary research on the effect of self-management on time management of involved stakeholders is advised.

Because of the possible bias in three questions from the nurse assessment, inter-rater reliability was calculated. Yet, in future research the inter-rater reliability of the complete SelfMED assessment should be determined, since the opinion of physicians can be a subject to bias and bias in other questions from the nurse assessment could be present.

When patients are found to be capable to self-manage, the nurse formulates a positive advice for the treating physician. It is expected nurses are adequately educated and have sufficient clinical judgment to assess a patient with the use of a checklist already providing all important topics. By providing these topics, reproducibility can be increased. The final decision on self-management can be taken by the physician. As this healthcare provider remains responsible for medication during hospital admission, the physician will be able to define which medicines can be self-managed. Previous qualitative research indicated physicians are more likely to prohibit patients to self-manage high-risk medication. Nevertheless, this viewpoint can be discussed and should be investigated further, for example transplant patients self-manage their medication in order to be able to manage them correctly after discharge. Allowing patients to already self-manage high-risk medication in a controlled environment

might ultimately result in a benefit for the patient [9]. Literature on the treatment of diabetes in hospital even encouraged patients to self-manage their insulin when hospitalized on the condition that this is also monitored by healthcare providers [24,25].

The current SelfMED monitoring tool provides an evaluation of medication self-management. If medication errors occur, the flowchart suggests healthcare providers to educate patients in order to prohibit the error from reoccurring. As this is a crucial step towards improving the self-management skills and possible medication knowledge further research should focus on expanding this aspect of the SelfMED procedure [26].

Previous literature on the effect of self-management of medication indicated several positive results. Nevertheless, these results should be taken into account cautiously due to methodological flaws and low-quality research [6,7]. Future research should therefore focus on the effect of self-management of medication on patient outcomes (patients satisfaction, medication errors during hospitalization, influence on therapy adherence after discharge, and patient self-management skills after discharge), the influence on quality of care, medication management processes, and influence on the healthcare costs.

The current SelfMED procedure was developed focusing on the average hospitalized patient on a cardiology ward. Therefore, it is important when using this procedure in a specific population, in example geriatric or psychiatric patients, adaptations in the assessment criteria might be needed in order to meet the aim of correctly assessing patients and supporting self-management of medication.

7.6 Conclusions

The SelfMED procedure developed and validated in this study has the potential to guide and support self-management of medication in hospital. Because of the inclusion of all important stakeholders within the medication management process, the evidence-based approach and the fit with current regulation the procedure distinguishes itself from previously described tools. Further refinements and validation in daily practice are advised, also a tool for providing tailor made interventions for medication related problems during self-management should be developed and validated.

7.7 Supplementary materials

The following are available in appendix IV or online at <http://www.mdpi.com/2226-4787/6/3/77/s1>, Figure A1: Development and validation of the SelfMED procedure, Figure A2: The SelfMED flowchart, Figure A3: The SelfMED procedure.

7.8 Author contributions

T.V., K.B., B.V.R., and T.D. contributed to conception of the study design. T.V. and T.D. supported inclusion of the participants and data collection. T.V. and T.D. analyzed and interpreted the data. T.V. drafted and wrote the original manuscript. T.V., K.B., B.V.R., and T.D. revised the manuscript. All authors read and approved the final manuscript.

7.9 Funding

Research for this work was financially supported by the Thomas More University College.

7.10 Acknowledgments

We would like to thank Anke Vankrunkelsven for her support during data collection

7.11 Conflicts of interest

The authors declare no conflicts of interest. We state that the funder had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, and in the decision to publish the results.

7.12 References

1. Parnell, M.A. Medicines at the bedside. *Am. J. Nurs.* **1959**, *59*, 1417–1418.
2. London Audit Commission. *A Spoonful of Sugar: Medicines Management in NHS Hospitals*; Audit Commission: London, UK, 2001.
3. McLeod, M.; Ahmed, Z.; Barber, N.; Franklin, B.D. A national survey of inpatient medication systems in english nhs hospitals. *BMC Health Serv. Res.* **2014**, *14*, 93.
4. The Society of Hospital Pharmacists of Australia Committee of Specialty Practice in Rehabilitation and Aged Care. SHPA standards of practice in clinical pharmacy. *J. Pharm. Pract. Res.* **2002**, *32*, 324–325.
5. Vanwesemael, T.; Van Rompaey, B.; Petrovic, M.; Boussery, K.; Dilles, T. Selfmed: Self-administration of medication in hospital: A prevalence study in flanders, belgium. *J. Nurs. Scholarsh. Off. Publ. Sigma Theta Tau Int. Honor Soc. Nurs.* **2017**, *49*, 277–285.
6. Richardson, S.J.; Brooks, H.L.; Bramley, G.; Coleman, J.J. Evaluating the effectiveness of self-administration of medication (sam) schemes in the hospital setting: A systematic review of the literature. *PLoS ONE* **2014**, *9*, e113912.
7. Wright, J.; Emerson, A.; Stephens, M.; Lennan, E. Hospital inpatient self-administration of medicine programmes: A critical literature review. *Pharm. World Sci. PWS* **2006**, *28*, 140–151.
8. Manias, E.; Beanland, C.J.; Riley, R.G.; Hutchinson, A.M. Development and validation of the self-administration of medication tool. *Ann. Pharmacother.* **2006**, *40*, 1064–1073.
9. Vanwesemael, T.; Boussery, K.; Manias, E.; Petrovic, M.; Fraeyman, J.; Dilles, T. Self-management of medication during hospitalisation: Healthcare providers' and patients' perspectives. *J. Clin. Nurs.* **2018**, *27*, 753–768.
10. Anderson, J.; Manias, E.; Kusljic, S.; Finch, S. Testing the validity, reliability and utility of the self-administration of medication (sam) tool in patients undergoing rehabilitation. *Res. Soc. Adm. Pharm. RSAP* **2014**, *10*, 204–216.
11. Royal decree setting out the standards which hospital pharmacies must meet to be authorized. In §§ 9°4. 1991. Available online :http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=nl&la=N&table_name=we&cn=1991030433 (accessed on 24 July 2018).
12. Morisky, D.E.; Green, L.W.; Levine, D.M. Concurrent and predictive validity of a self-reported measure of medication adherence. *Med. Care* **1986**, *24*, 67–74.
13. Myers, K.; Winters, N.C. Ten-year review of rating scales. I: Overview of scale functioning, psychometric properties, and selection. *J. Am. Acad. Child Adolesc. Psychiatry* **2002**, *41*, 114–122.
14. Keszei, A.P.; Novak, M.; Streiner, D.L. Introduction to health measurement scales. *J. Psychosom. Res.* **2010**, *68*, 319–323.
15. McHugh, M.L. Interrater reliability: The kappa statistic. *Biochem. Med.* **2012**, *22*, 276–282.
16. Tsang, S.; Royse, C.F.; Terkawi, A.S. Guidelines for developing, translating, and validating a questionnaire in perioperative and pain medicine. *Saudi J. Anaesth.* **2017**, *11*, S80–S89.
17. Gisev, N.; Bell, J.S.; Chen, T.F. Interrater agreement and interrater reliability: Key concepts, approaches, and applications. *Res. Soc. Adm. Pharm. RSAP* **2013**, *9*, 330–338.
18. Landis, J.R.; Koch, G.G. The measurement of observer agreement for categorical data. *Biometrics* **1977**, *33*, 159–174.
19. Keers, R.N.; Williams, S.D.; Cooke, J.; Walsh, T.; Ashcroft, D.M. Impact of interventions designed to reduce medication administration errors in hospitals: A systematic review. *Drug Saf.* **2014**, *37*, 317–332.
20. Onatade, R.; Miller, G.; Sanghera, I. A quantitative comparison of ward-based clinical pharmacy activities in 7 acute uk hospitals. *Int. J. Clin. Pharm.* **2016**, *38*, 1407–1415.

21. Schnipper, J.L.; Kirwin, J.L.; Cotugno, M.C.; Wahlstrom, S.A.; Brown, B.A.; Tarvin, E.; Kachalia, A.; Horng, M.; Roy, C.L.; McKean, S.C.; et al. Role of pharmacist counseling in preventing adverse drug events after hospitalization. *Arch. Intern. Med.* **2006**, *166*, 565–571.
22. Vanwesemael, T.; Boussery, K.; van den Bemt, P.M.; Dilles, T. The willingness and attitude of patients towards self-administration of medication in hospital. *Ther. Adv. Drug Saf.* **2018**, *9*, 309–321.
23. Preece, D.; Price, R. PS-076 the problem of medicines shortages in hospitals across Europe: The European Association of Hospital Pharmacists (EAHP) survey. *Eur. J. Hosp. Pharm. Sci. Pract.* **2014**, *21*, A174–A175.
24. Mabrey, M.E.; Setji, T.L. Patient self-management of diabetes care in the inpatient setting: *Pro. J. Diabetes Sci. Technol.* **2015**, *9*, 1152–1154.
25. Shah, A.D.; Rushakoff, R.J. Patient self-management of diabetes care in the inpatient setting: *Con. J. Diabetes Sci. Technol.* **2015**, *9*, 1155–1157.
26. Nieuwlaat, R.; Wilczynski, N.; Navarro, T.; Hobson, N.; Jeffery, R.; Keepanasseril, A.; Agoritsas, T.; Mistry, N.; Iorio, A.; Jack, S.; et al. Interventions for enhancing medication adherence. *Cochrane Database Syst. Rev.* **2014**, *2*, CD000011.



Chapter 8

The SelfMED procedure - self-management of medication on a cardiology ward: administration errors, registration errors and feasibility

Outline

8	The SelfMED procedure –self-management of medication on a cardiology ward: administration errors, registration errors and feasibility	129
8.1	Abstract	129
8.2	Background	130
8.3	Methods	131
8.3.1	Design	131
8.3.2	Participants	131
8.3.3	SelfMED intervention	131
8.3.4	Study outcomes	133
8.3.5	Data collection	133
8.3.6	Data analysis	133
8.4	Results	133
8.4.1	Implementation of the SelfMED assessment	133
8.4.2	Self-management of medication	135
8.4.3	Medication administration errors and registration errors	136
8.4.4	Feasibility of the SelfMED procedure	137
8.5	Discussion	138
8.5.1	Implementation of the SelfMED assessment	138
8.5.2	Medication administration errors and registration errors	138
8.5.3	Feasibility of the SelfMED procedure	139
8.6	Conclusion	140
8.7	Clinical Resources	140
8.8	Acknowledgements	140
8.9	References	141

8 The SelfMED procedure –self-management of medication on a cardiology ward: administration errors, registration errors and feasibility

This chapter has been submitted for publication:

Vanwesemael, T.; Boussey, K.; Jordan S.; Van Rompaey, B.; Dilles, T. The SelfMED procedure –self-management of medication on a cardiology ward: administration errors, registration errors and feasibility

8.1 Abstract

Purpose

This study aimed to evaluate the SelfMED procedure through the measurement of medication administration and registration errors, and evaluated the feasibility of the procedure.

Design

A descriptive intervention study was conducted in a Flemish regional hospital where all patients on a cardiology ward were included.

Methods

The SelfMED procedure was introduced to facilitate self-management of medication and consequently evaluate self-managed medication administration errors. All four cardiologists involved were surveyed on the feasibility of the procedure.

Findings

Of 159 patients screened on their competences for self-management, 61 were included for medication self-management. A total of 367 medicines were self-managed. Medication administration errors occurred on three occasions (0.8%). In six of the self-managed medicines (1.7%) an error in the patient's registration of the intake was registered. The SelfMED intervention was deemed feasible within the hospital ward. Yet, in the opinion of cardiologists it required a substantial time investment.

Conclusion

The SelfMED procedure facilitates self-management of medication and resulted in low numbers of medication administration and registration errors. Further refinement is recommended to increase feasibility.

Clinical relevance

The SelfMED procedure provided a guide for implementing and facilitating self-management of medication for hospitalized patients. Feasibility of the SelfMED procedure should be tested in larger trials.

Key words

self-management, medication systems, hospital, inpatients

8.2 Background

The concept of patients self-administering their medication in hospital is nothing new under the sun, since it was cited in literature since 1959 (Parnell, 1959). Recently, the term self-management of medication was introduced. Patients are not only administering their medication; they are supported in managing, storing, organizing and reporting their self-managed medication in hospital and receive education from healthcare professionals, such as nurses, physicians and hospital pharmacists (Vanwesemael, Boussery, et al., 2017).

Currently, 22% of Belgian hospitalized patients self-manage their medication. A cross-sectional observational study in 56 Flemish hospital wards indicated 10 wards (18%) had a self-management of medication protocol. Only four wards (7%) had an assessment available to determine patients' abilities to self-manage (Vanwesemael, Van Rompaey, Petrovic, Boussery, & Dilles, 2017). Research on the actual implementation of self-management of medication in acute hospitals in the United Kingdom indicated the uptake is variable (London Audit Commission, 2001; McLeod, Ahmed, Barber, & Franklin, 2014). Qualitative research on the perceptions of both healthcare providers (nurses, physicians and hospital pharmacists) and patients on self-management of medication pointed out ambiguity. This research regarded the prerequisites for self-management, impact on the current medication management process, legal responsibilities, and impact on medication safety (e.g. possible abuse of medication, medication getting stolen, medication errors due to incorrect self-management) (Vanwesemael, Boussery, et al., 2017).

There is no established tool or instrument to monitor the intake of self-managed medication in hospital order to prevent over- or under dosage, misuse or other problems concerning medication management. Lack of clarity and guidance may be impeding self-management of medication in hospital, and patients' capabilities need to be assessed. Therefore, the SelfMED procedure, including an assessment and monitoring tool, was developed and validated. The procedure offers a guide to evaluate whether self-management is advisable (SelfMED assessment), a monitoring tool for a structured follow up of patients self-managing their medication (SelfMED monitoring tool), and the possibility for nurses to intervene when medication errors occur (Vanwesemael, Dilles, Van Rompaey, & Boussery, 2018).

Literature indicated that self-management of medication increased patient knowledge of their medicines, and compliance: RCTs found that self-managing patients were more compliant than their controls (Richardson, Brooks, Bramley, & Coleman, 2014). Most patients and professionals had a positive attitude towards self-management of medication, but staff were concerned over increased workload, time spent educating patients, preparing medication and medication lists, work stress, and a perception of increased medication errors, all due to self-management (Manias, Beanland, Riley, & Baker, 2004; Richardson et al., 2014; Vanwesemael, Boussery, et al., 2017). Simultaneously, if patients were reliably confirmed to be self-managing then nurses described a decrease in time spent on medication administration, 'drug rounds', and discharge planning. However, findings remain inconclusive, and further research is needed (Richardson et al., 2014; Wright, Emerson, Stephens, & Lennan, 2006).

One important outcome in self-management of medication is the medication error rate. Previous research including healthcare professionals' and patient's perception on self-management indicated self-management could decrease medication errors, but healthcare providers feared patients misusing their medication (Manias et al., 2004; Vanwesemael, Boussery, et al., 2017). A systematic review confirmed that self-administering patients complied more with their therapy compared to a control

group. Also, descriptive studies reported high rates of compliance with the medicines regimens and low error rates (Richardson et al., 2014).

During this study, the SelfMED procedure (Vanwesemael et al., 2018) was implemented on a cardiology ward in a regional hospital. The aim of the current study was firstly to describe the number of medication administration and registration errors, and secondly to report the feasibility by the included cardiologists after the implementation of the SelfMED procedure. The study is considered as a pilot in preparation of a larger randomized clinical trial on the subject.

8.3 Methods

8.3.1 Design

A descriptive intervention study was conducted in a Flemish regional hospital. Approval of the ethics committee of the general hospital Klinka, Belgium, was provided on November 19th, 2015, reference number 031/200/015.

8.3.2 Participants

In a non-profit regional hospital (581 beds), all patients hospitalized on the participating cardiology ward (32 beds) – specialized in heart failure, cardio revalidation (revalidation after a revascularization procedure performed in another University hospital) and postinterventional care – were screened for eligibility in the study. Patients aged <18 years or unable to sign the informed consent were excluded. Figure 11 shows the participant flowchart.

8.3.3 SelfMED intervention

The SelfMED procedure, based on evidence and regulation, guides healthcare providers and patients in the different stages of self-management of medication (See Figure A1, appendix IV) (Vanwesemael et al., 2018). First, patients are assessed to decide whether they are eligible for self-managing medicines in hospital (SelfMED assessment). The stepped assessment is first performed by the nurse (1), if s/he deems the patient capable; the patient completes a self-assessment (2). Based on these data the nurse advises the treating physician. Finally, the treating physician takes the decision regarding self-management and defines which medicines can be self-managed (3). If a patient is allowed to self-manage, several precautions need to be taken: to provide the patient with a medication list, to deliver and to correctly store medication in the patient's room, to document the self-managed medication in the patient's medical file. Also, patients should be instructed about the use of the paper medication list to ensure that they are aware of the type of medication, the time of administration and the dosage of self-managed medication. When the self-managed medication is taken, patients are instructed to tick these off on the medication list on the time and date of administration (SelfMED monitoring tool). This allows nurses to observe medication administration errors, and if so, provide tailored interventions (Vanwesemael et al., 2018).

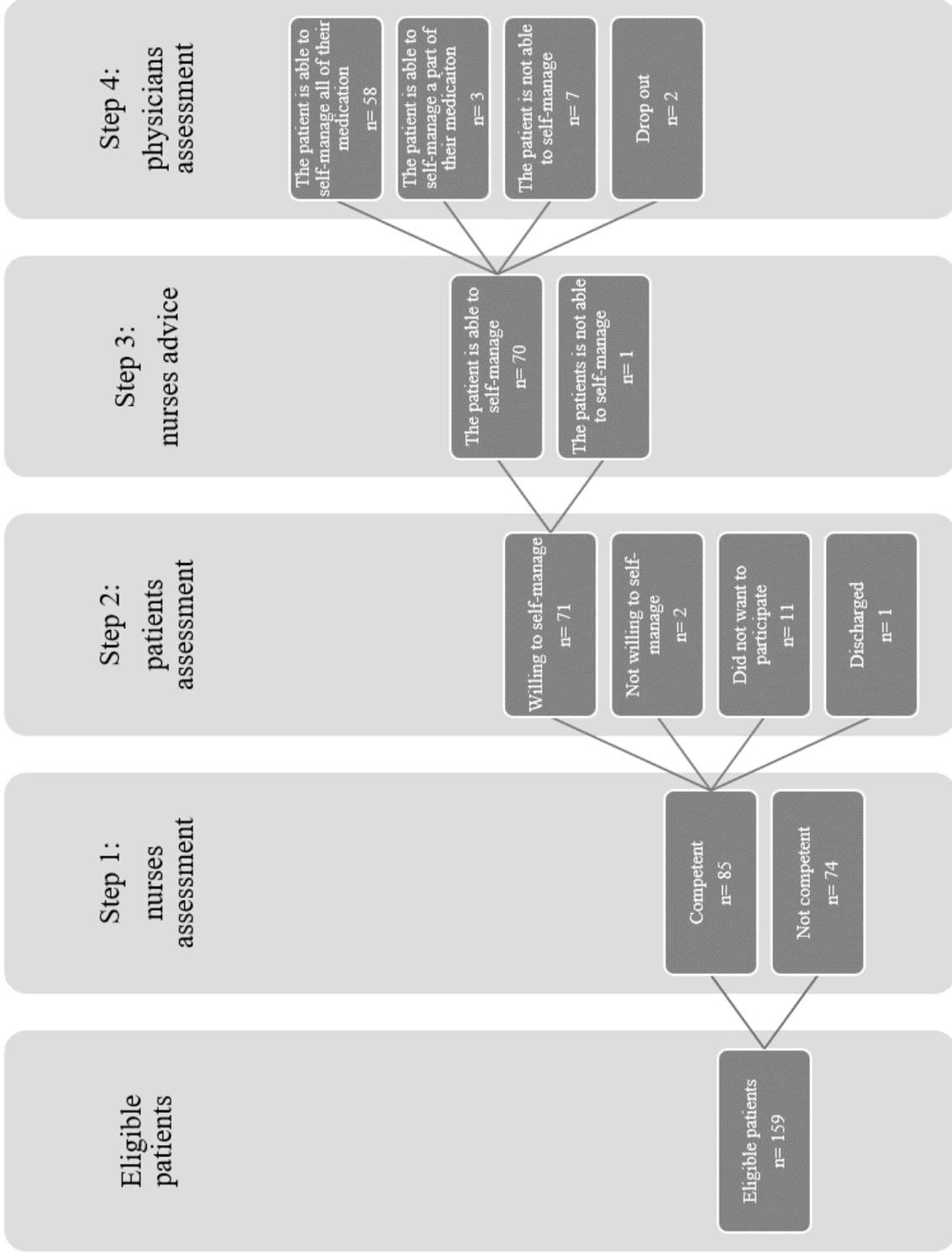


Figure 11. Flowchart of the participating patients in the study

8.3.4 Study outcomes

First, the primary outcomes of this study were observed, these concerned medication administration errors and registration errors. Medication administration errors were observed by means of a daily pill count by the head nurse. The nurse manually reconciles the number of remaining pills also confirming that the patient adhered to the therapy. In addition, the nurse evaluated possible discrepancies between the patient's logs of self-managed medication the patient stored on his/her room and the anticipated medication list on a daily basis. Any occurring problem was discussed with the patient in order to identify the reason for non-compliance. During this study, following medication administration errors were observed: not taking the prescribed medication, taking the wrong type of medication, administering medication at the wrong time. Also, ticking off the medication list incorrectly was considered as a medication registration error. This was also evaluated by comparing the patient's logs on the medication list and the anticipated medication list and performing a pill count. e.g., if a patient had taken his/her medicine correctly, but had not correctly ticked off the medicines list, this was identified by a correct pill count and an error on the medication list. Also, a discussion with the patient could confirm this medication registration error.

Second, the feasibility of the SelfMED procedure on this cardiology ward was explored with a structured questionnaire for the four included cardiologists. This questionnaire covered content, user-friendliness, time investment, and perceived consequences of self-management of medication in closed questions (7 questions, 10-point Likert scale; absolutely not satisfied – absolutely satisfied and 3 questions, 10-point Likert scale; strongly disagree – strongly agree). Free text comments were possible at the end of the questionnaire.

8.3.5 Data collection

Data were collected from February until March 2016. The stepped SelfMED assessment provided data on the nurse assessment, the patient self-assessment (extended with a questionnaire on demographics and medication intake at home), and the physician's decision on allowing or declining medication self-management in hospital. The SelfMED monitoring tool collected data from the patient's log on a medication list and the nurse's pill count.

8.3.6 Data analysis

The Statistical Package for Social Sciences version 24.0 (SPSS Inc., Chicago, IL, USA) was used to analyze the data. Shapiro-Wilk tests showed non-normality of the distributions of age and the number of self-management of medication. Nonparametric statistics were used to analyze 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. Self-managed medicines were coded using the Anatomical-Therapeutic-Chemical classification (WHO, 2014). A p-value of 0.05 was considered as statistically significant.

8.4 Results

8.4.1 Implementation of the SelfMED assessment

A total of 159 patients was eligible for inclusion in the study (See Figure 11). During the first step of the intervention, nurses assessed these patients using the nurse assessment, resulting in 85 patients being competent to perform self-management. Of these 85 patients, 11 did not consent to participate in the study, two were not willing to self-manage, and one patient dropped out of the study due to early discharge. Possible reasons for not willing to participate in the study or for not willing to self-manage medication were not collected. Based on the nurse assessment and the self-assessment the nurse

advised the physicians to let 70 of the resulting 71 patients, perform self-management of medication. The treating physician could reflect on the nurse assessment, self-assessment and the nurse's advice during the decision-making process. The treating physicians confirmed 58 patients able to self-manage all of their medication and three patients part of their medication.

As presented in Table 29, the most prevalent reasons for patients not to pass the nurse assessment were: not capable of handling changes in their medication regimen (n=48, 49.0%), mentally not capable to self-manage medication (n= 47, 48.0%), or not preparing their own medication at home (n= 44, 46.8%). Likewise, physicians reported the reasons for not allowing patients to self-manage during the final step of the assessment: a presumption of therapy nonadherence (n=2), the physician does not trust the patient (n=2), too many changes in the medication schedule (n=2) and the patient did not take any medication at home (n=1).

As described in Table 30, the median age of the population was 75 years. Self-managing patients were on average 70 years old, 5 years younger compared to those were not allowed to self-manage (p = .001, Mann-Whitney U). Overall, the total population consisted of 47.5% woman and 52.5% man. The majority of the included population completed secondary school as their highest level of education.

Self-managing patients used on average 4.5 different long-term medications at home and almost all (96.7%) completely self-managed these at home. One out of four of these patients had previously self-managed medication during a hospital admission.

Questions in the assessment	Positive assessment n=61 % (n)			Negative assessment n= 98 % (n)		
	Agree	Dis- agree	Un- known	Agree	Dis- agree	Un- known
1 The patient can prepare his/her own medication at home.	98.3 (59)	1.7 (1)	0.0	51.1 (48)	46.8 (44)	2.1 (2)
2 The patient administers his/her own medication at home.	100 (61)	0.0	0.0	78.7 (74)	19.1 (18)	2.1 (2)
3 After release from hospital the patient is capable of preparing and administering his/her own medication.	98.3 (60)	1.7 (1)	0.0	54.3 (51)	44.7 (42)	1.1 (1)
4 The patient is physically able to administer his/her own medication.	98.4 (60)	1.6 (1)	0.0	67.3 (66)	32.7 (32)	0.0
5 The patient is mentally capable of controlling his/her own medication.	100.0 (61)	0.0	0.0	52.0 (51)	48.0 (47)	0.0
6 I have no knowledge of substance abuse by the patient.	88.5 (54)	9.8 (6)	1.6 (1)	43.3 (42)	7.2 (7)	49.5 (48)
7 The expectation is that the patient can handle possible treatment.	96.7 (59)	3.3 (2)	0.0	48.0 (47)	49.0 (48)	3.1 (3)
8 The patient will not be exposed to any other medical interventions (e.g. surgery) where a new medication scheme will need to be implemented by nurses.	96.7 (59)	0.0	3.3 (2)	86.6 (84)	3.1 (3)	10.3 (10)
9 The expectation is that the hospitalisation will be long enough to allow the patient to commence his/her own medication therapy.	98.4 (60)	1.6 (1)	0	76.3 (74)	18.6 (18)	5.2 (5)
10 The patient speaks sufficient Dutch to understand the treatment (verbal, written).	100.0 (61)	0	0	91.8 (89)	4.1 (4)	4.1 (4)

Table 29. Nurse assessment

	All screened patients	Self-management not allowed	Self-management allowed
Age (years) *			
<i>Number of respondents</i>	158	97	61
mean ± SD	72.8 ± 13.6	75.0 ± 14.1	69.5 ± 12.0
median [range]	75.0 [23-95]	79.0 [23-95]	71.0 [45-89]
Gender (%) **			
<i>Number of respondents</i>	158	97	61
Female	47.5	65.3	34.7
Male	52.5	57.8	42.2
Level of education (%)			
<i>Number of respondents</i>			60
None			11.7
Primary school			18.3
Secondary school			48.3
Bachelor			18.3
Master			3.4
Number of chronic medicines taken at home			
<i>Number of respondents</i>			60
mean ± SD			4.5 ± 3.2
Medication management at home (%)			
<i>Number of respondents</i>			61
Self-management			96.7
Aid for preparing			3.3
Aid for preparing and taking			0.0
Self-management of medication during previous admission (yes, %)			
<i>Number of respondents</i>			61
			24.6

* Difference in age between the groups no self-management allowed/self-management allowed: $p = .001$, Mann-Whitney U

** Difference in gender between the groups no self-management allowed/self-management allowed: $p = .333$, Pearson Chi-square value

Table 30. Patient demographic data and medication management characteristics

8.4.2 Self-management of medication

A total of 367 medicines were self-managed in hospital by 61 patients with a median of 4 different self-managed medicines per patient [1-11]. The majority of these were medicines for the cardiovascular system (21.2%) and for blood and blood forming organs (8.9%). The median duration of self-management during hospitalization was 3 days (range 2 - 9 days) (See Table 31).

Characteristics		
Duration of medication self-management (days) (n= 61)	Mean ± SD	3.7 (1.4)
	Median [range]	3.0 [2-9]
Number of self-managed medication (n=61)		
	Total number of self-managed medication	367
	Mean per patient ± SD	5.0 (2.9)
	Median per patient [range]	4.0 [1-11]
Anatomical main group of self-managed medication (%) (n= 367)*		
	Alimentary tract and metabolism	6.0
	Blood and blood forming organs	8.9
	Cardiovascular system	21.2
	Dermatological drugs	0.0
	Genitourinary system and reproductive hormones	0.9
	Systemic hormonal preparations, excluding reproductive hormones and insulins	1.0
	Anti-infective for systemic use	0.6
	Antineoplastic and immunomodulating agents	0.1
	Musculoskeletal system	1.0
	Nervous system	3.3
	Antiparasitic products, insecticides and repellents	0.0
	Respiratory system	0.9
	Sensory organs	0.6

* Every self-managed medicine was categorized within its anatomical main group with the use of Anatomical Therapeutic Chemical Classification System (WHO, 2014)

Table 31. Characteristics of the self-managed medication

8.4.3 Medication administration errors and registration errors

Nine errors occurred (2.5%) on a total of 367 self-managed medicines (see Table 32). Nine different patients - 14.8% of the self-managing population - made these errors. In three cases a medication administration error was reported. One medication administration error concerned the medicine Gabapentine® (active substance: gabapentin), which was ticked off on the medicines list but not taken, as identified by the nurse's pill count. The second administration error concerned a pill which was found on the floor by the nurse. Yet, it could not be identified since the medicines list was ticked off correctly and the pill count was correct (1.3%). The third error concerned one patient (0.6%) who was informed on the decision to stop Cordarone® treatment (active substance: amiodarone hydrochloride). Yet, the patient administered this medicine one more time, as it was still available in the patient's room. This medication administration error was identified based on the medication list and a pill count. Subsequently, this medicine was removed from the patient's room.

n=367*	n (%)
Medication administration errors	
Patient did not take medication	2 (0.5)
Patient did take medication while treatment was stopped by the physician	1 (0.3)
Medication registration errors	
Took medication but did not tick off according to the pill count	4 (1.1)
Ticked off in wrong place	1 (0.3)
Ticked off but did not take medication according to the pill count	1 (0.3)
Total amount of errors	9 (2.5)

* number of self-managed medicines

Table 32. Errors in patient self-management

The majority of errors were registration errors; they were the result of patients who did not tick off the medication list (n = 4) or did this incorrectly (n= 1), while the patient actually had taken the correct medicine at the right time. In order to prevent these errors from reoccurring, the patients were informed by a nurse about the use of the medication list.

8.4.4 Feasibility of the SelfMED procedure

As shown in Table 33, all four cardiologists in this study completed a questionnaire on the feasibility of the SelfMED procedure on their ward. Overall, they scored a median score of 6.0/10 on their satisfaction of the SelfMED procedure, as on the user-friendliness of the procedure. A median score of 6.5 was provided on the content of the items of the nurse and patient assessment. The number of questioned items of the nurse and patient assessment scored the highest score (7.0/10). The time investment to facilitate self-management scored a low median score of 4.0/10. This low score was explained in the free text: when patients are only hospitalized for a few days, self-management is a time consuming task. Also, teaching patients on self-management of medication takes time. In conclusion, they suggested the SelfMED procedure would be a more relevant procedure in wards with a longer length of hospital stay.

Cardiologists stated in the free text that it was rather difficult to rate patient’s self-management of medication skills because their stay was too short, making it difficult to provide feedback and follow-up of self-management. This was consistent with the rating of 6.5/10 on SelfMED contributing to a better self-management of patients’ prescribed medical therapy. In addition, according to the cardiologists SelfMED did not contribute to a better communication between patients, nurses and physicians concerning the prescribed medical therapy (4.0/10 rating). Nevertheless, they agreed that self-management contributed to a better understanding of the patient’s competences in order to self-manage medication after hospital discharge (7.0/10 rating).

(n= 4)	Median [range]
Question on the satisfaction of ... ^a	
the SelfMED procedure	6.0 [3-7]
the content of the questioned items of the nurses’ assessment	6.5 [6-7]
the content of the questioned items of the patient self-assessment	6.5 [6-8]
the number of questioned items of the nurses’ assessment	7.0 [7-8]
the number of questioned items of the patient self-assessment	7.0 [7-8]
the user-friendliness of the SelfMED procedure	6.0 [5-7]
the time investment to facilitate self-management of medication	4.0 [3-5]
The SelfMED procedure contributes to... ^b	
a better self-management of the patients’ prescribed medical therapy	6.5 [5-8]
a better communication between patients, nurses and physicians concerning the prescribed medical therapy.	4.0 [3-5]
a better understanding of patients’ competences to self-manage medication after hospital discharge.	7.0 [6-7]

^a 10-point Likert scale; absolutely not satisfied – absolutely satisfied

^b 10-point Likert scale; strongly disagree – strongly agree

Table 33. Feasibility of the SelfMED procedure concerning participating cardiologists

8.5 Discussion

8.5.1 Implementation of the SelfMED assessment

During this study, the SelfMED assessment – as a part of the SelfMED procedure – was used in order to evaluate whether patients were capable of self-managing medication in hospital for the first time. The nurse assessment, being the first step of the SelfMED assessment, identified 85 patients being capable of self-management. Afterwards, these patients were invited to perform the self-assessment. Eleven patients did not complete this assessment as they did not volunteered to participate in the study, two patients indicated in the self-assessment they were not willing to self-manage their medicines, and one patient dropped out due to early discharge. During the third and final step of the SelfMED assessment, physicians identified 61 patients eligible for self-management. Reasons for deeming patients not capable of self-management comprised: the patient is not capable of handling changes in the medicines regimen, the patient is mentally not capable to self-manage, the patient does not adhere to the therapy, or the physician does not trust the patient. During this study, nurses and physicians did not take risks and excluded patients from the study if there were any doubts about the competences to self-manage based on the SelfMED assessment. Consequently, this may have biased our sample towards younger, fitter patients.

Nonetheless abovementioned reasons for excluding a patient for self-management, if a patient returns back home and it is expected s/he will be responsible for self-managing medication, action should be undertaken. As stated by the Society of Hospital Pharmacists of Australia, self-management of medication could identify and address problems as a part of the discharge planning process, and the assessment and success rate of self-management can determine the correct needs for support after hospital discharge (Davis et al., 2002). Therefore, the reasons for allowing or declining self-management of medication should be comprehensively evaluated, as are the consequences of this decision. Research on patients discharged on different wards (internal medicine, pulmonary medicine, neurology and cardiology) by Eibergen et al. indicated medication related problems occurred in 18 out of 104 included patients (15%). The problems were very diverse, e.g. patients did not know the indication and how to use their medication, they had concerns about combining all medicines, and did not receive their patient information leaflet, or got further prescription for supply (Eibergen, Janssen, Blom, & Karapinar-Carkit, 2018). This evidence stresses the importance of guiding patients and supporting them in order to self-manage medication in the hospital.

8.5.2 Medication administration errors and registration errors

Self-management of medication facilitated with the use of the SelfMED procedure resulted in three medication administration errors (0.8% of 367 self-managed medicines), caused by three different patients; no errors resulted in patient harm. Comparing our results with error rates included in a systematic review on descriptive studies on self-management of medication by Richardson et al. was found to be difficult. This because of the lack of a concise definition on medication errors, or a description on how they were observed (Richardson et al., 2014).

During our study, medication administration errors were evaluated with the use of the patient's log on their medication list and a pill count. Future research should use additional tools and supplementary observation of self-managing patients in order to more precise evaluate medication administration errors (e.g. wrong time, wrong dose, wrong administration technique, or wrong medicine). In order to compare care as usual and medication self-management, it is advised to include a control group with treatment as usual (nurse administered medication) and an intervention group (medication self-management). These study results can provide more insights, e.g. on the effect of the SelfMED procedure on the safety of patients in relation to for example medication errors. Besides the

observation of medication adherence during hospitalization, it is advisable to continue the follow-up after hospital discharge.

During this study observed errors included medication registration, resulting in four patients who did not tick off the administered medication and one patient did this incorrectly. We assumed the SelfMED monitoring tool may have affected this low number of errors, to be more precise the medication list on which patients logged their medicines intake influenced their behavior. It might be difficult for some patients to read, use or tick off the provided medication list. Consequently, further research should study this hypothesis.

8.5.3 Feasibility of the SelfMED procedure

The evaluation of the feasibility of the SelfMED procedure indicated that the involved cardiologists were satisfied with the number of questions within the SelfMED assessment. Also, they agreed the procedure contributed to a better understanding of the patient's competences in order to self-manage medication after hospital discharge. This knowledge on the patient's competences could be described as an advantage, given the fact that patients still experience problems such as a lack of knowledge, resource and self-efficacy which is required in order to self-manage after discharge when transitioning to their home environment (Pollack et al., 2016).

Overall, the cardiologists suggested to facilitate self-management in patients who remained hospitalized during a longer period as teaching patients on their medicines takes time. These findings were in line of those reported in a systematic review by Richardson et al. Although, teaching patients takes time, less time will be spent on medication preparation and administration. Also, patients successfully self-managing their medication will require a lower time investment (Richardson et al., 2014). In our study the aspect "time" is based on the perception of the cardiologists. Determining the exact time investment for facilitating self-management with the SelfMED procedure requires additional research.

Previous research indicated not only physicians play an important role in self-management of medication. Nurses, patients and hospital pharmacists are also involved in the SelfMED procedure (Vanwesemael et al., 2018; Vanwesemael, Van Rompaey, et al., 2017). Therefore, further research should include these stakeholders when evaluating feasibility and all components of the procedure (i.e. the SelfMED assessment, the SelfMED monitoring tool and the provided medication list) in daily practice.

This study was completely paper-based, as the medication management system on the ward did not allow the SelfMED procedure to be included within their medical software. Nevertheless, a strengths, weaknesses, opportunities and threats (SWOT) analyses on self-management of medication in hospital indicated the use of an electronic medical file is advised when implementing medication self-management. Hence, all healthcare providers have a constantly updated overview of self-managed and nurse administered medication (Vanwesemael, Boussery, et al., 2017). Therefore, we promote that the SelfMED procedure is included within the electronic medical software of hospitals. This would simplify the assessment of patients, resulting in immediately available information for all healthcare providers. Moreover, patients may be provided with an electronic device or application on which they can tick off their medicines (instead of the paper based medication list). This information would be directly linked to the medical software package of the hospital.

In general, it is possible to conclude this first test of the SelfMED procedure in daily practice was successful. Information on the functioning and application of the SelfMED assessment, the monitoring tool, the effect of self-management on patient medication errors, the feasibility of the procedure

within the ward and a reflection on the entire process are valuable and should be taken into account when preparing and installing a complex RCT.

8.6 Conclusion

The SelfMED assessment identified eligible patients willing to self-manage their medicines in hospital. The SelfMED procedure resulted in a low number of medication administration and registration errors. The intervention was feasible, but required a vast time investment. The potential of the SelfMED procedure should be explored in a long term follow up in a restricted population with a digital format and before proceeding to a multicentered randomized controlled trial.

8.7 Clinical Resources

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

8.8 Acknowledgements

We would like to thank the hospital team and Anke Vankrunkelsven for supporting data collection.

8.9 References

- Davis, A., Muir, P., Allardice, J., Clark, K., Groves, J., Molenaar, M., & Robson, G. (2002). SHPA Guidelines for Self-Administration of Medication in Hospitals and Residential Care Facilities. *Journal of Pharmacy Practice and Research*, 32(4), 324-325. doi:10.1002/jppr2002324324
- Eibergen, L., Janssen, M. J. A., Blom, L., & Karapinar-Carkit, F. (2018). Informational needs and recall of in-hospital medication changes of recently discharged patients. *Res Social Adm Pharm*, 14(2), 146-152. doi:10.1016/j.sapharm.2017.01.006
- London Audit Commission. (2001). *A Spoonful of sugar: Medicines Management in NHS Hospitals*. London Audit Commission.
- Manias, E., Beanland, C., Riley, R., & Baker, L. (2004). Self-administration of medication in hospital: patients' perspectives. *J Adv Nurs*, 46(2), 194-203. doi:10.1111/j.1365-2648.2003.02979.x
- McLeod, M., Ahmed, Z., Barber, N., & Franklin, B. D. (2014). A national survey of inpatient medication systems in English NHS hospitals. *BMC Health Serv Res*, 14, 93.
- Parnell, M. A. (1959). Medicines at the bedside. *Am J Nurs*, 59, 1417-1418.
- Pollack, A. H., Backonja, U., Miller, A. D., Mishra, S. R., Khelifi, M., Kendall, L., & Pratt, W. (2016). Closing the Gap: Supporting Patients' Transition to Self-Management after Hospitalization. *Proceedings of the SIGCHI conference on human factors in computing systems CHI Conference*, 5324-5336. doi:10.1145/2858036.2858240
- Richardson, S. J., Brooks, H. L., Bramley, G., & Coleman, J. J. (2014). Evaluating the effectiveness of self-administration of medication (SAM) schemes in the hospital setting: a systematic review of the literature. *PLoS One*, 9(12), e113912. doi:10.1371/journal.pone.0113912
- Vanwesemael, T., Boussery, K., Manias, E., Petrovic, M., Fraeyman, J., & Dilles, T. (2017). Self-management of medication during hospitalisation: Healthcare providers' and patients' perspectives. *J Clin Nurs*. doi:10.1111/jocn.14084
- Vanwesemael, T., Dilles, T., Van Rompaey, B., & Boussery, K. (2018). An Evidence-Based Procedure for Self-Management of Medication in Hospital: Development and Validation of the SelfMED Procedure. *Pharmacy (Basel)*, 6(3). doi:10.3390/pharmacy6030077
- Vanwesemael, T., Van Rompaey, B., Petrovic, M., Boussery, K., & Dilles, T. (2017). SelfMED: Self-Administration of Medication in Hospital: A Prevalence Study in Flanders, Belgium. *J Nurs Scholarsh*. doi:10.1111/jnu.12290
- WHO. (2014). *WHO collaboration centre for drug statistics methodology*. Retrieved from http://www.whocc.no/atc/structure_and_principles/
- Wright, J., Emerson, A., Stephens, M., & Lennan, E. (2006). Hospital inpatient self-administration of medicine programmes: a critical literature review. *Pharm World Sci*, 28(3), 140-151. doi:10.1007/s11096-006-9014-x



Chapter 9

Discussion

Outline

9	Discussion	145
9.1	Main findings of the SelfMED project	145
9.2	Strengths and limitations of the SelfMED project	146
9.3	The future of the SelfMED procedure	147
9.3.1	Refinements of the SelfMED procedure	147
9.3.2	Evaluation of the refined SelfMED procedure	149
9.3.3	The SelfMED procedure embedded in daily practice	151
9.4	References	152

9 Discussion

9.1 Main findings of the SelfMED project

The SelfMED project comprised three major aims. First, we aimed to describe the legal context of self-administration of medication and current practices including the prevalence of self-administration of medication in Flemish hospitals. In order to describe all relevant aspects of Belgian healthcare regulation related to self-administration of medication legal texts were consulted and the Care Inspection of the Flemish Division of Wellbeing, Public Health and Family was contacted. It was possible to conclude self-administration of medication can be provided within the current legal framework, yet conditions that are to be fulfilled are identified and should be taken into account. The most important are; noting the self-managed medicines down into the medical file, and adhering to the duty of care and surveillance. In addition, a clear image of the current prevalence rates of patients self-administering their medicines during hospitalization and the use of self-administration protocols and assessments was obtained. Self-administration of medication of at least one medicine occurs in over one out of five hospitalized patients in Flemish hospital wards. According to head nurses, almost double the number of these patients would be able to actually self-administer their medicines in hospital. The context in which self-administration takes place indicates the decision-making process on allowing self-administration of medication is mostly shared between the treating physician and/or the nurse and the patient, hospital pharmacists are hardly ever consulted. In addition, the presence of protocols and assessments for self-administration of medication in hospital is very limited. In conclusion, we identified self-administering patients are more likely to be female, are on average younger, have a better general health status and lower care dependency levels, have a lower number of different medications per day before hospitalization and during their hospital stay. More often, they come from their own home environment and return back there after discharge. Based on these results we aimed to develop an evidence based procedure, structuring self-management of medication in hospital with the potential to result in better medication self-management competences and therapy adherence.

As a first step in the preparation of the development of an evidence based procedure, we aimed to investigate stakeholders' perceptions and interests; this was also our second aim of the SelfMED project. By exploring and describing the willingness of patients, nurses, physicians and hospital pharmacists to perform or allow self-administration of medication, their attitude towards it, and prerequisites and perceived consequences of self-administration in hospital we aimed to increase success rates for a sustainable implementation. Before the start of these studies, it was unknown how self-administration of medication was managed in different hospitals, and which factors could facilitate or impede implementation. Furthermore, there was only a relatively small body of evidence that addressed the opinion of patients, nurses, physicians and hospital pharmacists towards medication self-management in hospital.

The conducted studies indicated healthcare providers and patients identify several important conditions for allowing self-administration of medication. These conditions are related to the patient (e.g. his/her mental and physical condition), to the medication itself (e.g. no self-administration of intravenous or intramuscular medication) and to the actual organization of self-administration (e.g. an overview of self-administered and nurse-administered medicines, a monitoring system for self-administration). Overall, all stakeholders involved with self-administration of medication show to be willing to facilitate and perform self-administration of medication in daily practice. It is possible to state they have a positive attitude towards it. In addition, they define possible strengths or benefits, weaknesses or disadvantages, opportunities and threats in relation to self-administration of medication. As a result of the SWOT analysis and the stated conditions, an overview of advised changes

in the medication management process for implementing self-administration of medication is being provided. Aforementioned study results played an important role in the development of a self-management of medication procedure. They provided insights in the willingness of stakeholders, in potential changes in the medication management process for implementing self-management of medication, important prerequisites and the potential consequences of self-management of medication.

During our third and final aim, we aimed to develop and validate an evidence based SelfMED procedure for patient self-management of medication whilst in hospital. In addition, we aimed to evaluate the number of medication administration errors and registration errors, and the feasibility after the implementation of the SelfMED procedure.

The SelfMED procedure was developed based on our previous research findings from the qualitative study on the perspectives of important stakeholders. Supplementary, literature on medication adherence and validated tools to assess patient competences to self-manage were examined and compared to the findings of the qualitative research. The SelfMED procedure also adhered to the regulation in relation to self-management of medication in hospital. In conclusion, the procedure is validated - as we aimed - by healthcare providers (on clarity, appropriateness, and face validity) and during a multidisciplinary expert meeting. Questions within the procedure that could be biased are tested for inter-rater reliability and show strong levels of agreement between raters. Afterwards, the SelfMED procedure was implemented for the first time, on a cardiology ward in a regional hospital. The study results indicate the SelfMED assessment – as a part of the procedure – is able to identify whether patients are able to self-manage their medicines in hospital. Self-management of medication, with the use of the SelfMED procedure, did not result in any severe or harmful medication administration errors. The SelfMED monitoring tool, which was also a part of the SelfMED procedure, enables healthcare providers to follow up and monitor self-managed medicines. With the use of this tool, a small number of medication registration errors occurred, reasons for these errors should be further examined. Furthermore, the intervention is found to be feasible concerning the opinion of involved cardiologists, but it requires a certain time investment.

9.2 Strengths and limitations of the SelfMED project

The SelfMED project provided a wide approach in order to describe the current situation of self-administration of medication in Flemish hospitals, the regulation concerning this topic and the perspectives and attitudes of important stakeholders. This resulted in a broad fundament of new knowledge, allowing us to develop the SelfMED procedure fitted for the Belgian healthcare system.

A specific strength of this project was the comprehensive dataset on the current rates of self-administering hospitalized patients and the number of wards that had an available procedure and screening tool to assess patient competences for self-administration. Nevertheless, we did not further question the context of self-administration, for example how this was defined or how patients were evaluated on their competences for self-administration.

By qualitatively evaluating the perspectives (SWOT analysis) and attitudes of nurses, physicians, hospital pharmacists and patients, a lot of in depth information concerning the topic of medication self-management was gained. This knowledge was tested and evaluated further in a larger and more diverse sample of stakeholders, with the use of quantitative structured interviews. These study results gave a much needed overview in order to assist implementation and facilitation of self-management in daily practice. Nonetheless, we studied perceptions and possible willingness to allow or perform self-management of medication in hospital. Due to this approach, it is not possible to state self-management will e.g. lead to an increased patient satisfaction or decreased nursing workload when

actually facilitated and evaluated in daily practice. Nor can we - based on our study results - state healthcare providers and patients will remain equally willing to allow or perform self-management when they are actually allowing and performing this in their daily routines.

The SelfMED procedure is developed based on the opinion of all important and involved stakeholders within the process of medication self-management in hospital, the current available literature, and the regulation concerning this topic is taken into account. Therefore, the SelfMED procedure distinguishes itself from previously developed interventions and tools related to the topic. During the validation process of the procedure, inter-rater reliability is calculated in order to evaluate possible bias in three questions from the nurse assessment. It is advised to not only evaluate these questions, as well the inter-rater reliability of the complete SelfMED assessment should be determined.

The SelfMED procedure was implemented on a cardiology ward in order to test the feasibility. Yet, we did not evaluate feasibility from the perspectives of all stakeholders, as we only questioned the involved cardiologists. In addition, we evaluated the number of medication administration errors and registration errors. Evaluation of the overall safety and the effect of self-management on therapy adherence, as an important patient related outcome, was not provided. Evaluating these patient related outcomes would have taken more time-intensive and expensive research, which was not possible within the SelfMED project. As a result of this narrowed data collection, the completeness and generalizability of our research findings were limited.

Overall, another strength from both the SelfMED project and the SelfMED procedure was the important clinical relevance. Data showed self-management of medication is allowed in daily practice, yet, it is performed without the use of any evidence based standards, guidelines, or protocols. It was clear during the process of the SelfMED project, healthcare providers saw potential within self-management as they deemed 40% of the hospitalized patients capable of performing this act, both they and patients were very willing to allow and perform this in daily practice and overall they both had a positive attitude.

9.3 The future of the SelfMED procedure

9.3.1 Refinements of the SelfMED procedure

All aspects of the SelfMED project finally resulted in the development and validation of the SelfMED procedure. This procedure consists of a stepped SelfMED assessment in order to evaluate the competences of patients for self-management of medication, practical issues for starting self-management of medication, and a SelfMED monitoring tool for evaluating self-management. Although, healthcare providers and patients stated the importance of a support tool for self-management of medication; this was not fully incorporated within the SelfMED procedure yet. The SelfMED procedure currently provides an evaluation of the self-managed medicines (SelfMED monitoring tool) and the possibility for healthcare providers to intervene with tailor-made interventions when problems arise. Therefore, it is highly recommended to further develop supportive educational interventions in case of non-adherence (SelfMED support) for self-managing patients; such as (digital) information leaflets on e.g. important side effects and how to prepare and administer medicines. As described by Bailey et al understanding and being able to monitor medication are important steps within the model of medication self-management (Bailey, Oramasionwu, & Wolf, 2013). Also, healthcare providers should be able to support self-managing patients. Literature already showed clinical pharmacists are well placed to take on this important role. Nevertheless, self-management of medication still requires a multidisciplinary approach in which also nurses and physicians should be involved in educating patients (Dunn et al., 2015; Nicholls, MacKenzie, & Braund, 2017).

Another topic that emerged out of the SelfMED project was related to the use of the patient's own medication during hospitalization. Concerning the Belgian Royal Decree of March 4th 1991, article seven, all medicines provided for diagnose or treatment of hospitalized patients should be delivered by the hospital pharmacist. Nevertheless, data showed in almost three out of four hospital wards patients used some medicines they brought from home during their hospitalization. Also, nurses, hospital pharmacists and patients are concerned whether patients would be able to recognize generic alternatives of their home medications. Furthermore, nurses and hospital pharmacists described common problems on medicines stock shortages and difficulties on obtaining rare medications. Nevertheless, the current SelfMED procedure adhered to the Belgian regulation concerning medication in hospital and did not allow patients to use their own medicines brought from home. Given the study findings, future development and evaluation of the procedure should explore the possibilities of the use and administration of patients' own medicines during self-management of medication. The administration of patients' own medicines during their hospital stay is encouraged and has already been seen in English NHS hospitals. The majority of NHS hospitals surgical and medical wards already administer patients' own medicines in daily practice (London Audit Commission, 2001; McLeod, Ahmed, Barber, & Franklin, 2014). A recent Dutch study report on the effect of this approach in hospital indicated this lowers hospital related medicines costs due to spillage, results in a more effective use of resources and an increased patient satisfaction compared to the use of medication from the hospital formulary (van Onzenoort, van Bunningen, & Meeuwissen, 2017). Also, it can presumably improve continuity of care and ensure continuation of therapy during hospitalization (Lummis, Sketris, & Veldhuyzen van Zanten, 2006). In addition, the South Australians Health (SA Health), provided a "Patients' Own Medications Policy Guideline" and stated "The administration of patients' own medication to patients during their hospital stay can enhance the continuity of care by facilitating the timely provision of essential medications not routinely available at the hospital. It also creates opportunities for detection of issues and patient counselling relating to current medicines" (Government of South Australia - SA Health, 2018).

When using patients' own medicines in hospital during self-management of medication, the quality of these medicines needs to be guaranteed, both the NHS and the SA Health already provided an overview on the aspects that should be checked. A summary on these aspects are; the medicine was prescribed for the current patient, medicines should be identified preferably in their original packaging or foil strip, the dose, name of the medicine, the form and strength of the medicines should be provided, the quantity dispensed and the date of dispensing, the batch number of the medicine, the expiry date, and the condition of the medicines container should be evaluated (Health, 2018; London Audit Commission, 2001). If a randomized controlled trial shows, the use of patients' own medicines during self-management of medication in hospital is beneficial, implementation of this practice has to be discussed with all stakeholders.

Some aspects of the current SelfMED procedure are identified for potential improvement. First, the abovementioned SelfMED support tool should be developed and included within the procedure. Secondly, during the SelfMED project healthcare providers stated they prefer a medication review, a continuously up to date overview of both self-managed and nurse-administered medicines, and a monitoring system for self-managed medicines. Therefore, we recommend integrating the SelfMED procedure within an ICT based system. Other possible advantages of a digital incorporated SelfMED procedure could be:

- The SelfMED assessment can be completed on a laptop (nurse assessment) or application on a medical device or cellphone (patient self-assessment):
 - The data will be analyzed automatically and the results are available to healthcare providers involved in the patient's self-management of medication process in hospital.
- The SelfMED monitoring tool allows patients to register their medication intake digitally on an application on a medical device or cellphone:
 - The exact time of medication intake can be automatically registered.
- The SelfMED assessment and monitoring tool is connected and linked to the hospital software, so data can be exchanged between the patient's medical files and the SelfMED tools:
 - Nurses on the ward, the treating physician, and the hospital pharmacist can look into the SelfMED assessment.
 - The medicines schedule can be transferred automatically to the SelfMED monitoring tool which is available on the patient's application or medical device.
 - Any type of medication changes can be adjusted automatically in the SelfMED monitoring tool of the patient, also all healthcare providers will be kept up to date on the most current medicines therapy prescribed.
 - If the patient registers the intake of a certain medicine, this can be checked immediately in the patient's medical file. This allows healthcare providers to obtain a permanent overview on whether a patient may have been forgotten to take their medicines.
 - Using a digitalized system, a broader range of educational and supportive means for self-management and adherence could be accessible; patients can e.g. be given videos or digital information leaflets.

In a distant future, the digital SelfMED procedure might also be integrated within the Belgian digital eHealth platform. It can be linked to Vitalink which is a digital platform from eHealth (Belgian Federal Government, 2018a, 2018b). Vitalink allows healthcare providers to access information concerning the well-being and care of the individual, they have a therapeutic relationship with. Integrating SelfMED into Vitalink could bridge care transitions and provide care continuity in relation to (self-management of) medication. By integrating SelfMED within Vitalink, patients can already use the SelfMED tools during their hospital stay. After hospital discharge, they will be able to continue using the SelfMED tools and for example have the same overview of their medicines at home, as they did in the hospital.

9.3.2 Evaluation of the refined SelfMED procedure

The digital SelfMED procedure with inclusion of the SelfMED support tool and possible use of patients' own medicines should be further evaluated and the effects of self-management of medication on several patient, healthcare provider and organization related outcomes should be evaluated. In order to succeed this aim, an intervention study should be installed. During this study, first one group of patients will receive treatment as usual (TAU), the second group is considered the intervention group in which the SelfMED procedure will be provided.

Period 1: TAU (n= 200) Patient related outcomes	Period 2: SelfMED procedure (n=200) Patient related outcomes
Medication knowledge <ul style="list-style-type: none"> • On admission • At discharge • At 2 months post discharge 	Medication knowledge <ul style="list-style-type: none"> • On admission • At discharge • At 2 months post discharge
Self-management ¹ <ul style="list-style-type: none"> • On admission • At discharge • At 2 months post discharge 	Self-management ¹ <ul style="list-style-type: none"> • On admission • At discharge • At 2 months post discharge
Adherence ² <ul style="list-style-type: none"> • During hospitalization: medication errors • During 2 months post discharge: prescription and refill databases or electronic monitoring * 	Adherence ² <ul style="list-style-type: none"> • During hospitalization: SelfMED monitoring tool • During 2 months post discharge: prescription and refill databases or electronic monitoring *
Patient satisfaction and autonomy <ul style="list-style-type: none"> • At discharge • At 2 months post discharge 	Patient satisfaction and autonomy <ul style="list-style-type: none"> • At discharge • At 2 months post discharge
Readmission rates related to medication use ³ <ul style="list-style-type: none"> • At 2 months post discharge 	Readmission rates related to medication use ³ <ul style="list-style-type: none"> • At 2 months post discharge
Health service utilization related to medication use ³ <ul style="list-style-type: none"> • At 2 months post discharge 	Health service utilization related to medication use ³ <ul style="list-style-type: none"> • At 2 months post discharge

¹ Proposed tool; Drug Regimen Unassisted Grading Scale (DRUGS): identification of the medication, access, dosage and correct timing of the medication intake (Advinha, Lopes, & de Oliveira-Martins, 2017; Edelberg, Shallenberger, & Wei, 1999).

² Adherence will be evaluated with the use of all three adherence components as described by Vrijens et al.; initiation (start of intake yes/no), implementation (% of medicines are taken) and persistence (early stop of intake). It can be expected that self-management will influence adherence to all medicines after hospitalization. Starting from an estimated increase in general adherence from 80-90% in the intervention group, a sample size of n=199 in each group will be needed to confirm (with a 2-sided significance level of 0.05 and a power of 0.80) the expected difference in adherence.

³ Health service utilization related to medication use concerns for example GP consultations, or information gained from informal caregivers. Data could be derived from medical insurance company databases and/or patient questionnaires.

* Electronic monitoring requires patient engagement compared to collecting data from prescription and refill databases (Vrijens, Antoniou, Burnier, de la Sierra, & Volpe, 2017)

Also, the effect of self-management of medication on healthcare providers and organization related outcomes should be evaluated. It is proposed to make an inventory of all actions undertaken in relation to pharmaceutical care when providing treatment as usual, and during the facilitation of the SelfMED procedure. Afterwards, this list can evaluate actual differences in the medication management process and logistics related to this process. In addition, it will also enable the actual timing of actions by participating observation and a comparison between TAU and the intervention period could be provided. In addition, these data could also provide an outline of the role of all stakeholders within the medication self-management process when implementing SelfMED. Supplementary, in both groups (TAU and intervention) satisfaction of patients, nurses, physicians and hospital pharmacists involved should be questioned. This could be done with the use of a SWOT approach. Supplementary data on the feasibility of the SelfMED procedure could also be collected, as these were lacking in the current SelfMED project.

The SelfMED project provided data on the prevalence and context of self-management of medication and the perspectives of nurses, physicians, hospital pharmacists and patients. This project provided an important foundation for further expanding the implementation and facilitation of patient self-management of medication in hospital. By clarifying the current regulation, exploring the stakeholder's perspectives and willingness, evaluating the current state of the art and bringing all these study results together, the SelfMED procedure was developed, validated and evaluated for the first time. As a result of the SelfMED project, it is possible to formulate a new research hypothesis; the digital SelfMED procedure which is linked to the hospitals digital software, includes a SelfMED support tool, and provides the use of patient's own medicines, can improve patient, healthcare provider and organization related outcomes.

9.3.3 The SelfMED procedure embedded in daily practice

The SelfMED project revealed self-management of medication during hospitalization is applied in clinical practice in an unstructured way. The project provided a structured approach for self-management and clarity concerning the current regulation on this topic and the role of every stakeholder within the process. Nonetheless, a lot of work still has to be done in order to actually introduce the SelfMED procedure in a diversity of hospital wards in daily practice. Study results indicated self-management of medication was allowed mostly in surgical short-stay wards (81.2%), psychiatric wards (32.1%), and surgical wards (22.1%). Yet, concerning the opinion of the cardiologists who tested the SelfMED procedure, the procedure would be a more relevant procedure in wards with a longer total length of hospital stay. Currently, it is not possible to state the SelfMED procedure is more beneficial for patients who remain hospitalized during a longer or shorter period of time. Overall, we aim for allowing self-management of medication, if effective and beneficial, in as many clinical settings as possible, so patients, healthcare providers and our healthcare system can benefit the implementation and its potential positive effects. Bearing in mind the use of the SelfMED procedure within different wards and patient populations, this could result in a slightly modified version in relation to the ward or patient needs.

9.4 References

- Advinha, A. M., Lopes, M. J., & de Oliveira-Martins, S. (2017). Assessment of the elderly's functional ability to manage their medication: a systematic literature review. *Int J Clin Pharm*, *39*(1), 1-15. doi:10.1007/s11096-016-0409-z
- Bailey, S. C., Oramasionwu, C. U., & Wolf, M. S. (2013). Rethinking adherence: a health literacy-informed model of medication self-management. *J Health Commun*, *18 Suppl 1*, 20-30. doi:10.1080/10810730.2013.825672
- Belgian Federal Government. (2018a). eHealth: Web-portal of services for eHealth. Retrieved from <https://www.ehealth.fgov.be/nl>
- Belgian Federal Government. (2018b). Vitalink: sharing information, vitally important. Retrieved from <http://www.vitalink.be/>
- Dunn, S. P., Birtcher, K. K., Beavers, C. J., Baker, W. L., Brouse, S. D., Page, R. L., Walsh, M. N. (2015). The role of the clinical pharmacist in the care of patients with cardiovascular disease. *J Am Coll Cardiol*, *66*(19), 2129-2139. doi:10.1016/j.jacc.2015.09.025
- Edelberg, H. K., Shallenberger, E., & Wei, J. Y. (1999). Medication management capacity in highly functioning community-living older adults: detection of early deficits. *J Am Geriatr Soc*, *47*(5), 592-596.
- Government of South Australia - SA Health (2018). *Patients' Own Medications Policy Guideline*, Policy No.: G0127.
- London Audit Commission. (2001). *A Spoonful of sugar: Medicines Management in NHS Hospitals*. London, UK: Audit Commission.
- Lummis, H., Sketris, I., & Veldhuyzen van Zanten, S. (2006). Systematic review of the use of patients' own medications in acute care institutions. *J Clin Pharm Ther*, *31*(6), 541-563. doi:10.1111/j.1365-2710.2006.00773.x
- McLeod, M., Ahmed, Z., Barber, N., & Franklin, B. D. (2014). A national survey of inpatient medication systems in English NHS hospitals. *BMC Health Serv Res*, *14*, 93. doi:p
- Nicholls, J., MacKenzie, C., & Braund, R. (2017). Preventing drug-related adverse events following hospital discharge: the role of the pharmacist. *Integr Pharm Res Pract*, *6*, 61-69. doi:10.2147/iprp.s104639
- van Onzenoort, H. A. W., van Bunningen, C. G. M., Kleven, P.J.M., & Meeuwissen, L. J. M. (2017). *The use of patients' own medicines in hospital*. Retrieved from <https://zoek.officielebekendmakingen.nl/blg-837705.pdf>
- Vrijens, B., Antoniou, S., Burnier, M., de la Sierra, A., & Volpe, M. (2017). Current Situation of Medication Adherence in Hypertension. *Front Pharmacol*, *8*, 100. doi:10.3389/fphar.2017.00100

Summary - Samenvatting

The definition of health and Dorothea Orem's General Theory of Nursing both stress out the importance of individuals being able to provide self-care and self-management. Within Orem's Theory of Nursing Systems, nurses should identify deficits related to self-care, and possible actions should be defined in order to tackle them. In recent years, an evolution towards increased patient self-management and self-care was observed. This resulted in more actively involved patients and healthcare providers who provided a more empowering approach. Because of increased self-management, focusing on the specific aspect of medication self-management, as one of the actions within self-management, is appropriate. Nevertheless, the importance of medication self-management, literature indicated individuals still struggle during this process resulting in an economic burden and a negative impact on several patient related outcomes.

Bearing in mind Orem's Theory of Nursing Systems and a majority of individuals who do not succeed in medication self-management, allowing patients to self-manage their medicines in hospital under supervision and with support of healthcare providers should be stimulated. Medication self-management could provide continuity in the medication self-management process of the patient, detect problems related to medication self-management and intervene by for example providing education, and result in better therapy adherence.

Literature on the prevalence of self-administration of medication in hospital is very scarce. An evaluation of existing guidelines for self-administration of medication in hospital identified they were not developed based on evidence, they were not validated, and were recently withdrew. Systematic reviews on this topic described a range of diverse self-administration of medication interventions, which also lacked an evidence based approach. Only one validated Australian assessment to evaluate the patient's ability to self-administer medication in hospital was identified. Literature on the effects of self-administration of medication revealed an increased patient adherence during hospitalization, increased patient medication knowledge, and increased patient satisfaction.

Notwithstanding, the existence of guidelines and several types of self-administration of medication interventions, these items are not sufficiently validated and their development was not based on the existing body of evidence. In addition, the existing guidelines, self-administration of medication interventions and the identified validated Australian tool could not be used, as they should comply Belgian rules and regulation concerning self-administration of medication in hospital. Therefore, the need for further studying the topic of self-administration of medication in Belgian hospitals was confirmed and the SelfMED study was launched.

The SelfMED study aimed;

- (1) to describe the legal context of self-administration of medication and current practices including the prevalence of self-administration of medication in Flemish hospitals.
- (2) to explore and describe the willingness of patients, nurses, physicians and hospital pharmacists to perform or allow self-administration of medication, their attitude towards it, and prerequisites and perceived consequences of self-administration in hospital.
- (3) to develop and validate an evidence based SelfMED procedure for self-management of medication by patients whilst in hospital, and to evaluate the number of medication administration errors and registration errors, and the feasibility after the implementation of the SelfMED procedure.

To describe the current legal context, Belgian legal texts and the Care Inspection of the Flemish Division of Wellbeing, Public Health and Family were consulted. It was possible to conclude self-administration of medication can be provided within the current legal framework, yet some conditions should be

fulfilled when facilitating medication self-administration in hospital. A clear image of the current context of self-administration of medication in daily practice in Flemish hospitals was described with the use of a cross-sectional study. Data were collected on all hospitalized patients at 57 wards, based in 12 hospitals. Of the 1,269 patients participating in this study, 22% self-administered at least one medicine during hospitalization and 13.8% self-administered at least 50% of their total amount of medication. In the opinion of the head nurse, 40.9% of the hospitalized patients would have been able to self-administer their medication during hospitalization. Only a few wards had an available procedure and screening tool to assess the competence of the patients to self-administer their medication. Self-administration occurred significantly more at surgical short-stay wards, compared to other wards. The self-administering patients were on average younger and female and had a lower number of different medications per day before and during hospitalization. These patients had a good health status and were independent to mildly dependent on nurses on the ward.

Overall, it is possible to conclude self-administration of medication can be facilitated within the current legal context. In daily practice, self-administration of medication was allowed, and even more patients would be able to self-administer their medication during hospitalization. Nevertheless, there is a lack of procedures and screening tools to assess the competence or appropriateness of patients to self-administer their medication.

To date, little was known on the willingness and attitude of important stakeholder in relation to the process of medication self-management. Also, very little was known on prerequisites and possible consequences of self-management of medication in hospital. Therefore, a qualitative descriptive study design was adopted, using semi-structured interviews and qualitative content analysis to examine data. Six physicians, 11 nurses, six hospital pharmacists and seven patients were recruited from one regional hospital and two university hospitals, situated in Belgium. Results indicated self-management of medication results in benefits for patients, nurses and could be beneficial for collaboration between patients and healthcare providers. Also, disadvantages for patients, nurses and physicians were described. In addition, participants described opportunities related to the organization, the patient and the process for implementing self-management. Also, some threats related to implementation of self-managed medications and the actual process of providing medication self-management were identified. The study results allowed us to provide a valuable overview of adaptations in the medication management process to facilitate implementation of self-management of medication. Supplementary, the study results were further examined during two quantitative cross-sectional observational studies. Nurses (n= 159), physicians (n= 76), hospital pharmacists (n= 36) and patients (n= 124) were questioned on their willingness and attitude towards self-administration of medication, and prerequisites and perceived consequences. Both studies identified stakeholders were willing to allow or perform self-administration of medication in hospital. In line with these findings, they had a positive attitude towards the topic. Nevertheless, stakeholders stated important conditions and prerequisites which need to be considered in order to implement self-management of medication in hospital.

Based on our knowledge concerning the legal context of medication self-management, the current prevalence, the stakeholder's attitude and important prerequisites, it was possible to develop the SelfMED procedure. Afterwards, it was validated by healthcare providers and a multidisciplinary expert meeting. Questions within the procedure that could be biased were successfully tested for inter-rater reliability. The SelfMED procedure consists of a stepped assessment - SelfMED assessment -, that evaluates whether patients are eligible for self-managing medicines in hospital. If a patient is allowed to self-manage, several measures need to be taken e.g. provide the patient with a medication list. When self-managing, the SelfMED monitoring tool will evaluate this process. This allows nurses to detect medication administration errors, and if so, provide tailor made interventions. The SelfMED procedure was implemented for the first time during a descriptive intervention study in

a Flemish regional hospital. All patients on a cardiology ward were included in the study. The procedure was introduced to facilitate self-management of medication, and to evaluate self-managed medication errors. All four cardiologists involved were surveyed on the feasibility of SelfMED. It was possible to conclude the SelfMED procedure facilitated self-management of medication. Of 159 patients who were screened on their competences for self-management, 61 patients were found capable and participated in the study. A total of 367 medicines were self-managed. Actual medication administration errors occurred on three occasions (0.8%). In six of the self-managed medicines (1.7%) an error occurred in the patient's registration of the intake. The SelfMED intervention was deemed feasible within the ward, yet in the opinion of cardiologists it required a substantial time investment.

The SelfMED project provided a wide approach in order to describe the regulation concerning self-management of medication in hospital, the current situation of self-management in Flemish hospitals, and the perspectives and attitudes of important stakeholders. This resulted in a broad fundament of new knowledge, allowing us to develop the SelfMED procedure. It is advised to further refine the procedure, to invest in evaluating the effect on different outcomes and to embed this approach in daily practice.

De definitie van gezondheid en Dorothea Orem's Algemene Verpleegkundige Theorie leggen beiden de nadruk op het belang van zelfzorg en zelfmanagement. Volgens Orem's Theorie van Verpleegkundige Systemen spelen verpleegkundigen een belangrijke rol in het identificeren van zelfzorgtekorten en het opstellen van acties om deze tekorten aan te pakken. In de afgelopen jaren was er een duidelijke evolutie naar meer patiënt zelfmanagement en zelfzorg. Deze evolutie resulteerde in actieve betrokken patiënten en zorgverleners die patiënten meer empoweren. Door de toename in zelfmanagement is de focus op een specifiek aspect hiervan, met name medicatie zelfmanagement, aangewezen. Ondanks het belang, blijkt het proces van medicatie zelfmanagement nog steeds zeer gevoelig aan problemen. Doordat individuen er niet in slagen succesvol medicatie zelf te managen, is er sprake van een grote economische impact en een negatieve impact op diverse patiënt gerelateerde uitkomsten.

Met in het achterhoofd Orem's Theorie van Verpleegkundige Systemen en een meerderheid van individuen die er niet in slagen aan correct medicatie zelfmanagement te doen, zou het toestaan van medicatie zelfmanagement in het ziekenhuis met de nodige monitoring en ondersteuning moeten worden aangemoedigd. Medicatie zelfmanagement zou continuïteit in het medicatie zelfmanagement proces van de patiënt kunnen waarborgen, zou problemen gerelateerd aan medicatie zelfmanagement kunnen detecteren waarvoor interventies zoals educatie kunnen worden geïmplementeerd en kan resulteren in een betere therapietrouw.

Er is een zeer beperkt aanbod van wetenschappelijke literatuur met betrekking tot de prevalentie van medicatie zelfmanagement in ziekenhuizen. Een evaluatie van de bestaande richtlijnen voor medicatie zelfmanagement in ziekenhuizen bracht aan het licht dat deze niet ontwikkeld werden op basis van de bestaande evidentie, de nodige validatie ontbrak en tevens werden ze recentelijk ingetrokken. Systematic reviews met betrekking tot het onderwerp beschreven een zeer divers aanbod van medicatie zelfmanagement interventies, die eveneens de nodige wetenschappelijke onderbouwing en validatie ontbraken. Eén gevalideerd Australisch assessment dat in staat is tot het evalueren van de competenties van patiënten voor het uitvoeren van medicatie zelfmanagement in ziekenhuizen werd geïdentificeerd. Evidentie over de gevolgen van medicatie zelfmanagement in ziekenhuizen bracht aan het licht dat patiënten meer therapietrouw zijn tijdens de opname, hun medicatiekennis toeneemt en de tevredenheid stijgt.

Niettegenstaande dat er richtlijnen en diverse medicatie zelfmanagement interventies bestaan, zijn deze onvoldoende gevalideerd en was hun ontwikkeling onvoldoende gebaseerd op bestaande wetenschappelijke literatuur. Daarenboven konden de richtlijnen, interventies en het assessment niet gebruikt worden, aangezien deze niet voldeden aan de Belgische regels en wettelijke context. Bovenstaande bevindingen duiden het belang van verder onderzoek binnen het topic van medicatie zelfmanagement in Belgische ziekenhuizen en noopten ons tot de start van het SelfMED onderzoek.

Het SelfMED onderzoek beoogde:

- (1) het beschrijven van de huidige wettelijke context in relatie tot medicatie zelfmanagement en de huidige context van medicatie zelfmanagement in Vlaamse ziekenhuizen.
- (2) het exploreren en beschrijven van de bereidheid van patiënten, verpleegkundigen, artsen en ziekenhuisapothekers om medicatie zelfmanagement uit te voeren en toe te staan, hun attitude ten opzichte van dit topic, mogelijke voorwaarden en gevolgen van medicatie zelfmanagement in ziekenhuizen.

(3) het ontwikkelen en valideren van een wetenschappelijk onderbouwde SelfMED procedure voor medicatie zelfmanagement door patiënten tijdens hun hospitalisatie, en het evalueren van het aantal medicatie inname fouten en medicatie registratie fouten, alsook de haalbaarheid na de implementatie van de SelfMED procedure.

Om de huidige wettelijke context te beschrijven werden de Belgische wetteksten en de Zorginspectie van het Departement Welzijn, Volksgezondheid en Gezin geconsulteerd. Het is mogelijk te besluiten dat medicatie zelfmanagement kan worden voorzien binnen de huidige wettelijk context, maar dat er voorwaarden zijn waaraan voldaan moet worden. Een duidelijk beeld over de huidige context van medicatie zelfmanagement in Vlaamse ziekenhuizen werd beschreven aan de hand van een cross-sectionele studie. Er werden gegevens verzameld van alle gehospitaliseerde patiënten op 57 diensten uit 12 ziekenhuizen. Van de 1296 deelnemende patiënten managede 22% zelf minimaal één geneesmiddel en 13.8% managede minstens 50% van hun totaal aantal te nemen geneesmiddelen. Volgens de mening van de bevraagde hoofdverpleegkundigen zou 40.9% van de gehospitaliseerde patiënten in staat zijn tot medicatie zelfmanagement. Een beperkt aantal diensten had een procedure of screeningsinstrument ter beschikking voor medicatie zelfmanagement in het ziekenhuis. Zelfmanagement kwam significant meer voor op chirurgische kortverblijf afdelingen, in vergelijking tot andere diensten. Patiënten die aan zelfmanagement deden waren voornamelijk jonger, vrouw en namen een lager aantal verschillende geneesmiddelen voor en na de hospitalisatie. Deze patiënten hadden daarenboven een betere gezondheidsstatus en waren in beperkte mate afhankelijk van de hulp van verpleegkundigen op de dienst.

Algemeen is het mogelijk te besluiten dat medicatie zelfmanagement kan gefaciliteerd worden binnen de bestaande wettelijke context. In de dagelijkse praktijk werd medicatie zelfmanagement reeds toegestaan en potentieel zijn er nog meer patiënten die dit zouden kunnen uitvoeren tijdens hun hospitalisatie. Desondanks ontbreken er de nodige procedures of screeningsinstrumenten voor medicatie zelfmanagement in het ziekenhuis.

Tot dusver was er weinig kennis over de bereidheid en attitude van belangrijke stakeholders met betrekking tot medicatie zelfmanagement in ziekenhuizen. Verder ontbrak voldoende kennis over belangrijke randvoorwaarden of gevolgen van medicatie zelfmanagement. Om deze hiaat in kennis aan te pakken werd een kwalitatieve beschrijvende studie opgezet. Dit onderzoek hanteerde semi-structureerde interviews waarna de resultaten aan een kwalitatieve inhoudsanalyse werden onderworpen. Zes artsen, elf verpleegkundigen, zes ziekenhuisapothekers en zeven patiënten werden gerekruteerd uit één algemeen ziekenhuis en twee universitaire ziekenhuizen binnen België. De resultaten van deze studie toonden aan dat zelfmanagement van medicatie kan resulteren in voordelen voor patiënten, verpleegkundigen en de samenwerking tussen patiënten en zorgverleners. Alsook werden nadelen voor patiënten, verpleegkundigen en artsen omschreven. Aanvullend zagen respondenten kansen voor de uitvoering van medicatie zelfmanagement, deze waren gerelateerd aan de organisatie, de patiënt en het proces van implementatie van zelfmanagement. Eveneens werden barrières met betrekking tot de implementatie van het concept en de gevolgen voor het effectief proces van medicatie zelfmanagement besproken. De onderzoeksresultaten maakten het mogelijk een overzicht te voorzien van aanpassingen die nodig zijn om medicatie zelfmanagement te faciliteren in ziekenhuizen.

Aanvullend werden deze studieresultaten verder onderzocht tijdens twee kwantitatieve cross-sectionele studies. Verpleegkundigen (n= 159), artsen (n= 76), ziekenhuisapothekers (n= 36) en patiënten (n= 124) werden bevraagd over hun bereidheid en attitude ten aanzien van medicatie zelfmanagement in ziekenhuizen, mogelijke randvoorwaarden en gevolgen hiervan. Beide onderzoeken tonen aan dat de stakeholders bereid zijn tot medicatie zelfmanagement. In overeenstemming met deze resultaten hebben ze een positieve attitude ten aanzien van het topic.

Belangrijke randvoorwaarden werden geïdentificeerd, deze dienen weloverwogen te worden alvorens medicatie zelfmanagement te implementeren in ziekenhuizen.

Op basis van onze kennis omtrent het wettelijk kader van medicatie zelfmanagement, de huidige prevalentie, de attitude en belangrijke randvoorwaarde van de stakeholders, was het mogelijk om een SelfMED procedure te ontwikkelen. Deze werd vervolgens gevalideerd door zorgverleners en een multidisciplinaire expertmeeting. Vragen die mogelijke bias kunnen ervaren werden succesvol getest op hun inter-beoordelaars betrouwbaarheid. De SelfMED procedure bestaat uit een getrap assessment – SelfMED assessment – dat zorgverleners in staat stelt om patiënten te evalueren op hun competenties voor medicatie zelfmanagement in het ziekenhuis. Indien patiënten effectief medicatie zelf mogen managen, dienen verschillende item voorzien te worden zoals bijvoorbeeld een medicatielijst voor de patiënt. Tijdens het medicatie zelfmanagement zal de SelfMED monitoring tool het proces evalueren. Deze tool laat verpleegkundigen toe om medicatiefouten te detecteren en indien nodig specifieke interventies te voorzien.

De SelfMED procedure werd voor de eerste maal geïmplementeerd in de praktijk gedurende een beschrijvende interventie studie in een Vlaams regionaal ziekenhuis. Alle patiënten op de dienst cardiologie werden geïnccludeerd in de studie. De procedure werd geïntroduceerd om medicatie zelfmanagement te faciliteren en om medicatie fouten te evalueren. Vier cardiologen die deelnamen aan de implementatie van de procedure werden na afloop ook bevraagd over de haalbaarheid hiervan. Het is mogelijk te concluderen dat de SelfMED procedure medicatie zelfmanagement faciliteerde. In totaal werden 159 patiënten gescreend voor deelname, 61 patiënten werden capabel bevonden en namen deel aan het onderzoek. Een totaal van 367 geneesmiddelen werden in zelfmanagement genomen. Tijdens dit zelfmanagement van medicatie werden drie medicatie inname fouten geregistreerd (0.8%). Bij zes geneesmiddelen (1.7%) registreerde de patiënt deze foutief op de medicatie aftekenlijst. De SelfMED procedure werd als haalbaar gezien, maar vraagt volgens de cardiologen een zekere tijdsinvestering.

Het SelfMED project voorzag een brede aanpak om de wettelijke context van medicatie zelfmanagement in ziekenhuizen te omschrijven, de huidige situatie van zelfmanagement in de dagelijkse praktijk en de perspectieven en attitudes van belangrijke stakeholders. Dit alles resulteerde in een brede basis van nieuwe kennis, die ons in staat stelde tot het ontwikkelen van de SelfMED procedure. Het is aangeraden om deze procedure verder te verfijnen, te investeren in het verder evalueren van het effect van de procedure op diverse outcomes en deze uiteindelijk te borgen in de dagelijkse praktijk.

Appendices

Outline

Appendix I Self-management of medication – terminology	162
Appendix II Prevalence self-administration of medication in hospital	163
Appendix III Medicatie in eigen hand	164
Appendix IV Development and validation of the SelfMED procedure	167
Appendix V Medicatie in eigen beheer: werkt dat?	176

Appendix I Self-management of medication – terminology

The concept of self-management of medication in hospital was already described in literature since 1959 by Marie A. Parnell. The article described self-management of medication in hospital as a way “to keep pace with the modern philosophy of care”. This quote relates to the majority of obstetric patients being young, intelligent, and trustworthy, who undergo a normal physiologic process. Terminology such as ‘bedside self-medication’ and ‘self-administered medications’ was used to describe nurses teaching mothers on their medicines by showing labels, calling out the name of the medicine and explaining its purpose. In addition, these nurses encouraged mothers to take their medicines, like they would do in their own home. More recent NHS guidelines, publications from hospital pharmacist society’s, and literature on the topic of medication self-management in hospital also implemented the term ‘self-administration of medication’.

During the SelfMED project, it was noted the term ‘self-administration of medication’ does not cover the broad range of aspects who include this process; for example the need for a procedure who includes an assessment to determine the patient’s ability to self-administer medication, a monitoring tool to support and evaluate the act of medication self-administration in hospital, and a supportive tool to support self-administering patients. As a result of this broad range of aspects related to self-administration of medication, advised changes within the medication management process were provided. In addition, self-administration of medication requires a multidisciplinary approach, and the engagement of the patient as a key stakeholder within this process. Resulting from the lengthy process within the SelfMED project, the term ‘self-management of medication’ was proposed. This term allows to include the broader range of aspects previously described and takes into account the role of every stakeholder.

Appendix II Prevalence self-administration of medication in hospital

Participant characteristics (n= 1258)	Men	Women	p
Age (years) (mean ± SD)	63±17.6	66±20	0.002*
Number of medications taken at home (mean ± SD)	5.9±4.7	6.8±4.4	0.002*
Discharge destination (%)			
Home	66.8	71.3	
Nursing home	8.1	11.0	
Other hospital	4.0	0.5	<0.001**
Rehabilitation	4.5	4.3	
Other	4.2	4.2	
Care dependency (%)			
Independent	25.0	25.6	
Mildly dependent	36.7	40.3	0.013**
Dependent	16.3	19.1	
Completely dependent	22.0	15.0	
Health status (%)			
Good	18.8	24.3	
Rather good	39.6	45.4	<0.001**
Rather bad	32.0	24.7	
Bad	9.6	5.6	

*Independent T-test

**Chi-square test

Table A1. Differences in participant characteristics between men and women

Rationale	Rationale to prohibit SAM**‡ % (n= 967)	Rationale to allow SAM**‡ % (n= 275)
The patient's ability to hear	2.3	75.7
The patient's ability to see	2.5	75.7
The patient's desire concerning SAM*	5.6	75.4
The patient's ability to express himself/herself	7.1	82.2
The patient's ability to ask for advice concerning medication	9.3	80.8
The occurrence of SAM* at home	10.8	82.2
The patient's medication adherence	12.3	79.3
The patient's motor skills	14.8	82.2
The patient's knowledge on medicines	18.9	75.0
The patient's mental status	23.1	84.4
The patient's health status	31.4	77.9
Medication taken at home by the patient was changed	8.2	
The type of medication taken by the patient has too many risks	13.1	
The opinion of the involved caregivers on SAM*	24.2	
The procedures of the hospital or ward do not allow SAM*	56.3	

* SMM: self-administration of medication

‡ The head nurse was able to select multiple reasons for each patient, which supported the decision of prohibiting or allowing self-administration of medication.

Table A2. Reasons for prohibiting or allowing self-administration of medication

Medicatie in eigen hand

Een patiënt die wordt opgenomen in het ziekenhuis, moet vaak zijn medicatiebeheer uit handen geven. **En dat terwijl medicatie in eigen beheer juist kan leiden tot een betere therapietrouw en een hogere patiënttevredenheid.** Hoe de vlag erbij hangt, wordt nu onderzocht in het SelfMED project.

tekst **Toke Vanwesemael, Tinne Dilles***

Het SelfMED project van de Thomas More Hogeschool en de Universiteit Antwerpen bestudeert de randvoorwaarden en effecten van medicatie in eigen beheer van de patiënt tijdens een ziekenhuisopname. Eigen medicatiebeheer kan namelijk therapietrouw, self-management en patiënttevredenheid bevorderen.^{1,2,4,5,6} Deze benadering erkent de patiënt als partner in de zorg. De huidige trend ontwikkelt zich echter steeds meer naar het overnemen en controleren van elke fase van het geneesmiddelenproces, waarbij de autonomie van de patiënt, educatie en self-management worden genegeerd. Dit ondanks het feit dat verpleegkundigen steeds trachten om patiënten de mogelijkheid te laten om zoveel mogelijk aan zelfzorg te doen.

Wij zijn benieuwd naar de mening van Vlaamse zorgverleners en patiën-

ten over medicatie in eigen beheer tijdens een ziekenhuisopname en willen een systeem ontwikkelen om medicatie in eigen beheer op een veilige en patiëntvriendelijke manier te kunnen ondersteunen in de praktijk. Vandaar dit onderzoek.

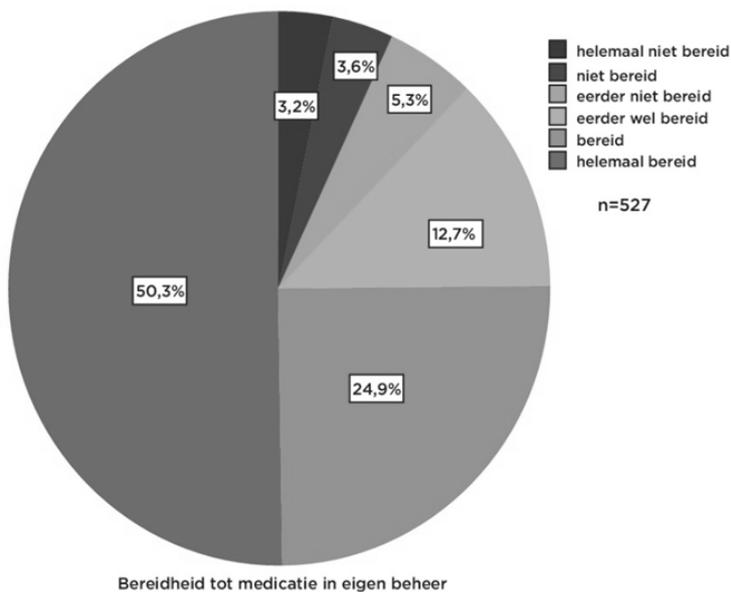
Medicatiebeheer in het ziekenhuis

Wanneer patiënten worden opgenomen in een ziekenhuis, dan nemen zorgverleners het beheer van hun medicatie meestal over. Na het

ontslag worden patiënten verondersteld zelf hun medicatie te kunnen beheren. Zorgverleners bereiden hen slechts beperkt voor op het thuisbeheer van de eigen medicijnen. Maar onderzoek toont juist aan dat medicatie in eigen beheer van de ziekenhuispatiënt autonomie, self-management, therapietrouw, veiligheid en tevredenheid van patiënten kan vergroten, mits ondersteund door verpleegkundigen.^{1,2,4,5,6} Deze benadering erkent de patiënt bovendien als een gerespecteerde partner in de zorg.

MEDICATIE IN EIGEN BEHEER IS...

Onder medicatie in eigen beheer verstaan we het volgende: patiënten mogen gedurende hun ziekenhuisopname onder bepaalde voorwaarden medicatie zelf bewaren, klaarzetten en innemen, mits ondersteund door artsen, verpleegkundigen en apothekers. Het gaat hierbij om medicatie die de patiënt na de opname thuis moet innemen. Het doel is dat hij leert de medicatie op correcte wijze te nemen, zodat hij dat thuis makkelijk kan voortzetten.



Bron: Patiëntenbevraging over medicatie in eigen beheer tijdens de ziekenhuisopname van Tinne Dilles en Toke Vanwesemael. Nog niet gepubliceerd.

Het is nog maar beperkt duidelijk in welke mate Vlaamse ziekenhuizen medicatie in eigen beheer toestaan of stimuleren. Uit een cross-sectioneel pilootproject in een Vlaams ziekenhuis, bleek dat medicatie in eigen beheer van de patiënt regelmatig voorkomt. Van de 81 geïncludeerde patiënten beheerden 26 (32%) minstens één medicijn zelf. Dit gold vooral voor medicatie per os (58%) en inhalatietherapie (39%). Classificatie van de zorgzwaarte gebeurde aan de hand van het San Joaquin Patiëntenclassificatiesysteem. Hieruit bleek dat voornamelijk

patiënten met een zorgzwaarte 1 en 2, respectievelijk zelfzorg en lichte zorg, een deel van hun medicatie zelf beheerden. De beslissing om medicatie in eigen beheer van de patiënt toe te staan, werd nooit genomen aan de hand van een protocol of procedure. De personen die betrokken werden bij het nemen van deze beslissing waren voornamelijk artsen (13/26), verpleegkundigen (10/26) en patiënten (18/26). De ziekenhuisapotheker was niet betrokken bij deze besluitvorming. Het feit dat patiënten thuis reeds

medicatie zelfstandig beheerden, was de voornaamste reden om dit toe te staan.⁴

Het SelfMED project

Literatuurstudie toont dus - onder bepaalde voorwaarden - de voordelen aan van medicatie in eigen beheer. Pilootonderzoek bevestigt bovendien dat medicatie in eigen beheer reeds oogluikend wordt toegelaten. Mede op basis van deze gegevens bepaalden we de onderzoeksopzet. Het SelfMED onderzoek bestaat uit vijf deelprojecten:

1. Het in kaart brengen van het wetenschappelijk en maatschappelijk kader waarbinnen medicatie in eigen beheer in Vlaanderen mogelijk is.
2. Epidemiologisch onderzoek naar medicatie in eigen beheer. Het eerder genoemde pilootproject dat op kleine schaal aangaf dat medicatie in eigen beheer voorkomt, zal multicentrisch worden uitgevoerd.
3. Kwalitatief onderzoek naar de randvoorwaarden van medicatie in eigen beheer volgens patiënten, artsen, verpleegkundigen en apothekers. Dit wordt vervolgd door een grootschalige kwantitatieve bevraging.
4. Een SelfMED toolbox maken die zorgverleners en patiënten de nodige ondersteuning biedt in het uitvoeren van medicatie in eigen beheer van de patiënt gedurende de ziekenhuisopname.
5. Een interventiestudie die controleert of de toolbox voldoet aan de noden van zorgvragers en zorgverleners.

Mening patiënten

In het najaar van 2014 werd de bereidheid tot medicatie in eigen beheer geëvalueerd door interviews met acht gehospitaliseerde patiënten en gemeten bij 527 niet-gehospitaliseerde personen die minstens twee chronische geneesmiddelen namen. Hun bereidheid om de medicatie zelf

Eigen medicatiebeheer kan therapietrouw, self-management en patiëntentevredenheid bevorderen

UW ERVARING TELT!

Zou u willen deelnemen aan het perceptieonderzoek van zorgverleners over medicatie in eigen beheer? Dat is mogelijk via www.nvkvv.be > nieuws > Vragenlijst SelfMED, indien u werkt in een Vlaams ziekenhuis. Dit onderzoek wordt niet alleen uitgevoerd onder verpleegkundigen, maar ook onder artsen en ziekenhuisapothekers. De vragenlijst gaat onder meer in op uw bereidheid om medicatie in eigen beheer van de patiënt gedurende de opname toe te staan en welke belangrijke voorwaarden daar volgens u aan verbonden zijn. U kunt **tot uiterlijk 31 mei 2015** de vragenlijst invullen. Onze dank is groot.

te beheren gedurende een hospitalisatie bleek groot (88%, zie tabel). Op voorwaarde dat hun fysieke en mentale gezondheidstoestand het zou toelaten op het moment van de hospitalisatie, achtte 80% van de bevroegden zichzelf in staat om medicatie zelfstandig klaar te zetten en vervolgens ook in te nemen. De meesten waren van mening dat het de kwaliteit van hun geneesmiddeleninname zou verbeteren zowel tijdens als na de opname. De geïnterviewden gaven aan dat het voor hen erg belangrijk is gedurende de volledige opname gemonitord te worden. Indien hun fysieke of mentale gezondheidstoestand het niet zou toelaten, moet er de mogelijkheid bestaan om

Medicatie in eigen beheer bestaat wel in Vlaamse ziekenhuizen, maar het gebeurt nogal ad hoc

de verantwoordelijkheid terug in handen van het team te geven.

Mening zorgverleners

Ook de mening van zorgverleners is van belang, omdat zij immers de zelfmedicatie moeten begeleiden. Om tot een geschikte vragenlijst te komen, voerden we 24 oriënterende interviews uit, op basis waarvan een vragenlijst werd ontwikkeld. Door middel van de vragenlijst kreeg een grote groep zorgverleners de mogelijkheid om hun mening te geven.

Uit de 24 gesprekken bleek alvast dat de bereidheid van geïnterviewde artsen, apothekers en verpleegkundigen in ziekenhuizen om self-management van medicatie te ondersteunen zeer groot is. Zij bevestigden dat medicatie in eigen beheer al voorkomt in de ziekenhuizen, maar vaak op een ongestructureerde wijze, en hadden vertrouwen in de positieve impact van een gestructureerde aanpak van medicatie in eigen beheer voor patiënten en zorgverleners. Deze gestructureerde aanpak moet volgens hen minimaal de aansprakelijkheid van zorgverleners uitklaren en ondersteuning voorzien voor zorgverleners

en patiënten. Daarnaast moet geëvalueerd worden hoe kan worden omgegaan met de levering van andere merken van thuismedicatie vanuit de ziekenhuisapothek.

In een grootscheeps, digitaal perceptie-onderzoek willen we de mening van zorgverleners verder peilen. In het kader op deze pagina staat beschreven hoe u daarbij kunt helpen.

*Promotor onderzoek: Prof. dr. Tinne Dilles, Departement gezondheidszorg Thomas More in Lier, en Centre for Research and Innovation in Care, Universiteit Antwerpen. Onderzoeker: dra. Toke Vanwesemael, dit onderzoek kadert in haar doctoraatsthesis. Toke werkt als wetenschappelijk onderzoeker aan de Thomas More Hogeschool in Lier. Contact: Toke.Vanwesemael@ThomasMore.be.

Literatuur

- 1 Barnason S, Zimmerman L, Hertzog M, et al. (2010). Pilot testing of a medication self-management transition intervention for heart failure patients. *West J Nurs Res*, 32(7), 849-870.
- 2 Bolster D, Manias E. (2010). Person-centred interactions between nurses and patients during medication activities in an acute hospital setting: qualitative observation and interview study. *Int J Nurs Stud*, 47(2), 154-165.
- 3 Hellema L, Huyge I, Vanhoof E. (2014). Eigen medicatiebeheer tijdens een ziekenhuisopname. Als ik het kan, mag het dan? Bachelorproef Thomas More, Campus Lier.
- 4 Lam P, Elliott RA, George J. (2011). Impact of a self-administration of medications programme on elderly inpatients' competence to manage medications: a pilot study. *J Clin Pharm Ther*, 36(1), 80-86.
- 5 Tran T, Elliott RA, Taylor SE, Woodward MC. (2011). A Self-Administration of Medications Program to Identify and Address Potential Barriers to Adherence in Elderly Patients (January). *Ann Pharmacother*.
- 6 Wright J, Emerson A, Stephens M, et al. (2006). Hospital inpatient self-administration of medicine programmes: a critical literature review. *Pharm World Sci*, 28(3), 140-151.

Appendix IV Development and validation of the SelfMED procedure

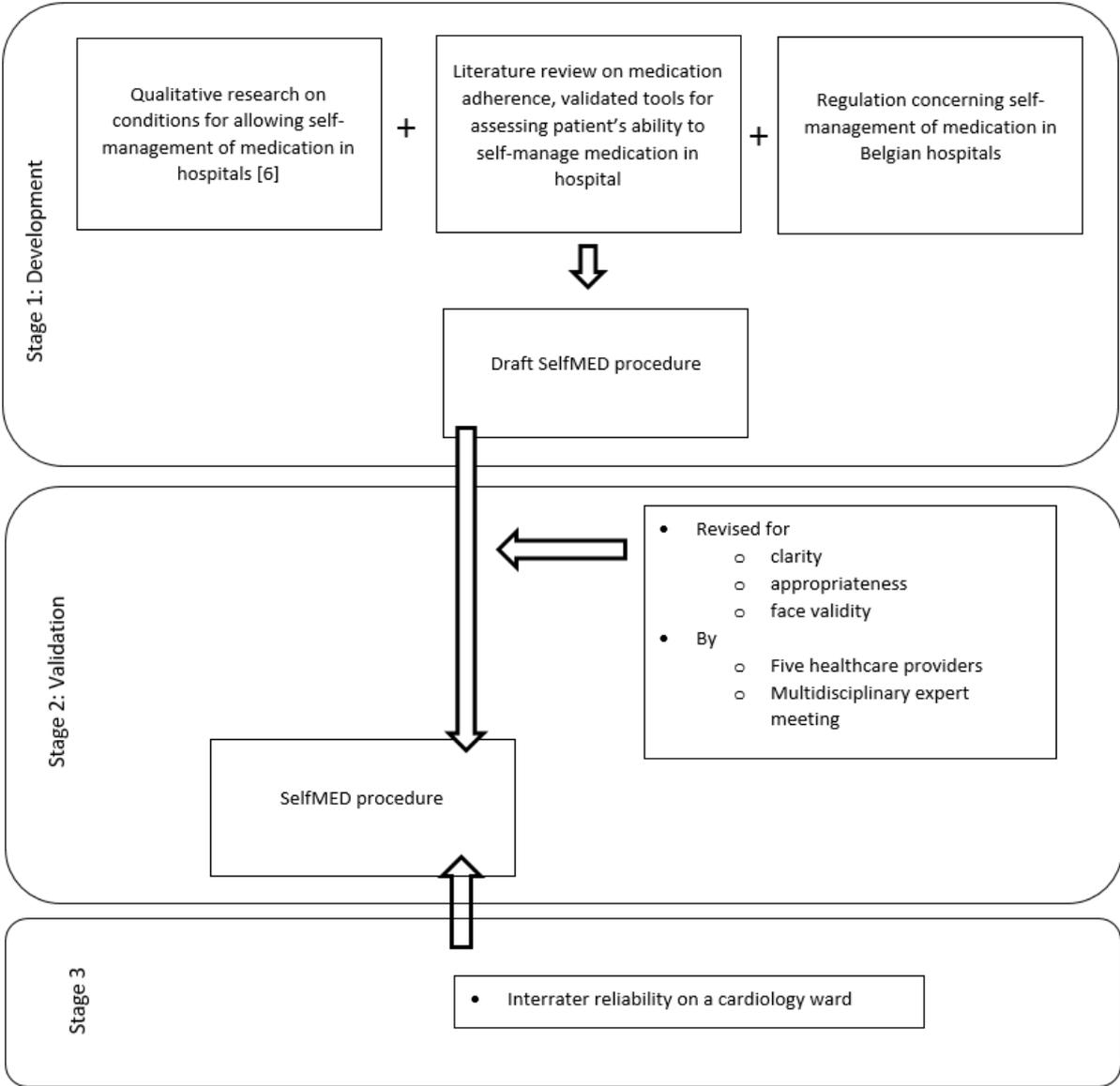
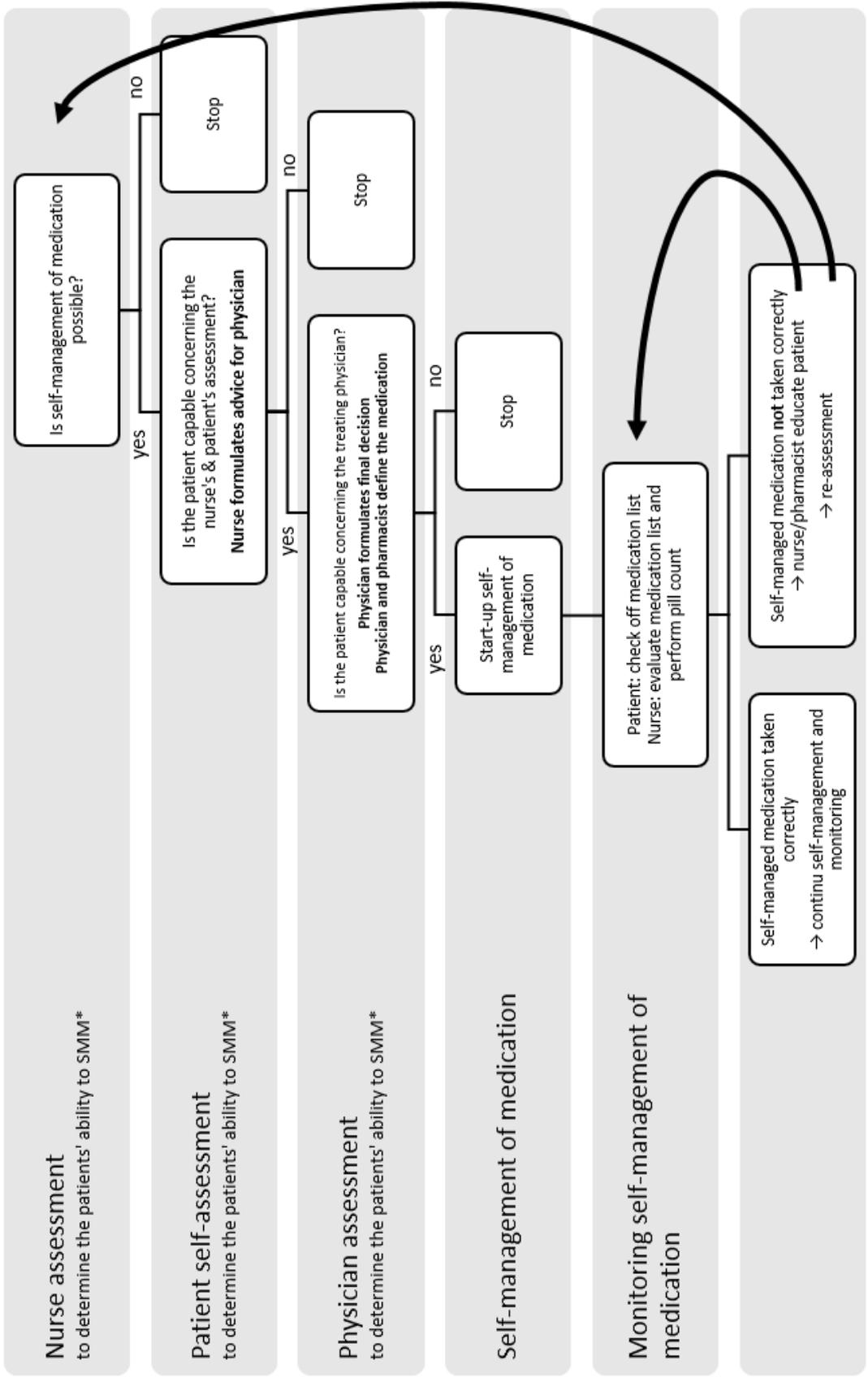


Figure A1. Development and validation of the SelfMED procedure



* SMM: Self-management of medication
Figure A2: The SelfMED flowchart

2 Self-assessment

The following questions need to be answered by the patient which will be included in the assessment

1 How do you administer your medication at home?

- I can prepare and administer my medication
- The medication is prepared for me (i.e. using pre-filled medication dosage) but I am able to administer it myself
- The medication is prepared for me (i.e. using pre-filled medication dosage) and I need help with administering the medication (i.e. the medication is administered by family, nurses or caregivers) → if this is applicable you don't have to complete the questionnaire

2 Would you be prepared, with support from caregivers, to control your own medication during your hospital stay?

- Yes, I would
- No, I would not → if this is applicable you don't have to complete the questionnaire

3 Do you believe, with support and control from caregivers, you can manage your own medication during your hospital stay?

- Yes
- Yes, with support from/or with help of:
- No

4 Do you sometimes forget to take your medication? Check the correct answer

- Never
- Sometimes
- Frequently
- Usually

5 People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your medicine?

- No, I took my medication correctly
- Yes, I missed taking my medication once
- Yes, I frequently missed taking my medication
- Yes, I always missed taking my medication

6 Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?

- Never
- Sometimes
- Frequently
- Usually

7 When you travel or leave home, do you sometimes forget to bring along your medicine?

- Never
- Sometimes
- Frequently
- Usually

8 When you feel like your symptoms are under control, do you sometimes stop taking your medicine?

- Never
- Sometimes
- Frequently
- Usually

9 Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?

- Never
- Sometimes
- Frequently
- Usually

10 How often do you have difficulty remembering to take all your medicine?

- Never
- Sometimes
- Frequently
- Usually

3 Recommendation for the patient's self-medication

Based on the assessment of the nurse and the patient's self-assessment the following is recommended. For a negative assessment, there is then a recommendation for the timescales for any follow-up assessment (for example 2 days after an operation).

<p>Recommendation:</p> <ul style="list-style-type: none"><input type="radio"/> The patient is not able to control self-medication.<input type="radio"/> The patient is able to control self-medication. Recommended support..... <p>Re-evaluation of recommendation...</p> <ul style="list-style-type: none"><input type="radio"/> No further re-evaluation during current hospitalization.<input type="radio"/> Re-evaluate on: /..... /..... (date) <p>Remarks:</p> <p>.....</p> <p>.....</p>

5 Practical issues for starting self-management of medication

It is important to note down overall attention points and agreements around self-management of medication. Below mentioned items will be a guideline for the execution of the self-management.

- Create a checklist in consultation with the ward on all topics that need to be provided when patients start to self-manage their medication: note down in the patient's medical file which medication will be self-managed, provide a medication list for the self-managed medication, order self-managed medication from the hospital pharmacy, provide education on the self-managed medication and the use of the medication list.
- Medication can be self-managed (preferably in closed lockers, personal locker, nightstand) and self-administered by the patient. The allowed self-managed medication needs to be discussed with the relevant department, treating physician and hospital pharmacist.
- On a daily base the patient needs to register on the medication list per medicine the dose and the timing of the medication intake. It's allowed that the patient uses additional tools like a clock or an alarm to remind him of the medication intake.
- It is important that the patient immediately gets a new medication list when adjustment/updates are needed.
- The medication lists who are not correct or outdated, will be stored in a specific place as agreed by the hospital ward.
- In consultation with the ward there will be a daily check of the medication list on the patient's room. This can be performed during the last medication round. The results of the daily checks should be noted down on the follow up section. Performing a pill count is optional.
- If a patient needs to be re-assessed during a certain time, the result can be noted down on the follow up section. Also, if the patient's health status declines this can be noted down.

6 Follow up self-management of medication

The follow up section needs to be completed by the nurses covering the following topics

- **Column 1:** To be completed daily with the date and the nurse's initials

- **Column 2:** The patient self-manages medication: complete on a daily basis

- If the patient is able to complete their self-medication tick 'YES'

- *If the patient is unable to complete their self-medication state the reason why. Where relevant refer back to reason in section one (nurse assessment) and enter corresponding number. If a new reason, then enter full description.*

After a planned re-evaluation then respond either:

- Positive re-evaluation based on the criteria directed then enter 'Yes': for example, day 2 after surgery re-evaluation indicated a patient is capable of self-managing medication, tick 'Yes'.

- Negative re-evaluation based on criteria directed then enter 'No' and the give full details of reason and advise response, where relevant refer back to original evaluation and enter any additional recommendations required.

- **Column 3:** Enter details of visual confirmation of completeness of medication routine as specified in original prescription. If a pill count is performed note down the result. If medication self-management is performed correctly enter 'OK'. If incorrect then note the specific details of the error. For example – incorrect quantity, incorrect timing. Give the specific medication details.

- **Column 4:** If there is any patient deviation from the predetermined criteria and/or prescribed medication, then enter details of any corrective actions that have been implemented, possibly in consultation with the physician. Examples; further education, patient reminders, ...

- **Column 5:** If the self-medication can continue then tick 'Continue'. If the self-medication is to be discontinued then tick 'Stop'. Any outstanding medication dosage is then under the control and supervision of the nurse

medicatie

Medicatie in eigen beheer: werkt dat?

In een aantal Belgische ziekenhuizen beheren patiënten hun eigen medicatie. Een onderzoeksteam van Universiteit Antwerpen en Thomas More Lier zocht uit **hoe ziekenhuispatiënten en zorgverstrekkers daartegenover staan** en op welke manier we hier in de praktijk mee aan de slag kunnen.¹

tekst **Isabelle Rossaert**

Ziekenhuispatiënten die zelf verantwoordelijk zijn voor hun medicatie-inname: het past helemaal in het plaatje van de patiënt als actieve partner in de eigen gezondheidszorg, een streven dat wordt aangemoedigd door de Wereldgezondheidsorganisatie. Onderzoek wijst uit dat medicatie in eigen beheer een positieve invloed kan hebben op onder andere de patiënttevredenheid, therapietrouw en de competenties van patiënten om aan zelfzorg te doen. In een eerder onderzoek werd vastgesteld dat een vijfde van de bevroegde patiënten al een of meerdere medicijnen zelf innam gedurende de hospitalisatie.²

Het mag

Wettelijk is het in België toegestaan dat patiënten zelf hun medicatie beheren, op voorwaarde dat dit wordt geregistreerd in het medisch dossier van de patiënt en dat duidelijk is gespecificeerd over welke medicijnen het precies gaat. Het zorgverstrekkend personeel heeft de plicht tot zorg en tot toezicht indien de patiënt zelf zijn medicatie beheert. De behandelend arts draagt de eindverantwoordelijkheid: hij beslist of de patiënt zijn medicatie zelf kan beheren en evalueert met het team of deze dat goed doet.

Zelfmanagement van medicatie houdt volgens de onderzoekers overigens meer in dan dat de patiënt zelf zijn medicatie

inneemt. Patiënten moeten leren hoe en wanneer ze hun medicijnen moeten nemen (educatie) en hun medicijngebruik moet ook goed gepland en gemonitord kunnen worden door het team van zorgverstrekkers.

Onderzoeksopzet

Welke voordelen, nadelen, kansen en hindernissen zien de betrokkenen zelf? Dit werd onderzocht aan de hand van een kwalitatief onderzoek.¹ Hiertoe deden de onderzoekers semigestructureerde interviews met de belangrijkste betrokkenen: zes artsen, elf verpleegkundigen, zes ziekenhuisapothekers en zeven patiënten uit drie verschillende ziekenhuizen.

Resultaten

Een van de grote voordelen die zowel patiënten als verpleegkundigen benoemen is dat de patiënt zijn medicatiegebruik kan verderzetten zoals hij dat thuis gewend is. Omgekeerd kan hij tijdens de opname leren hoe hij naderhand thuis zijn medicijngebruik kan voortzetten. Dat versterkt de autonomie van de patiënt en kan een positieve invloed hebben op therapietrouw. Nam de patiënt thuis zijn medicatie verkeerd in, dan kan dat tijdens de opname gecorrigeerd worden.

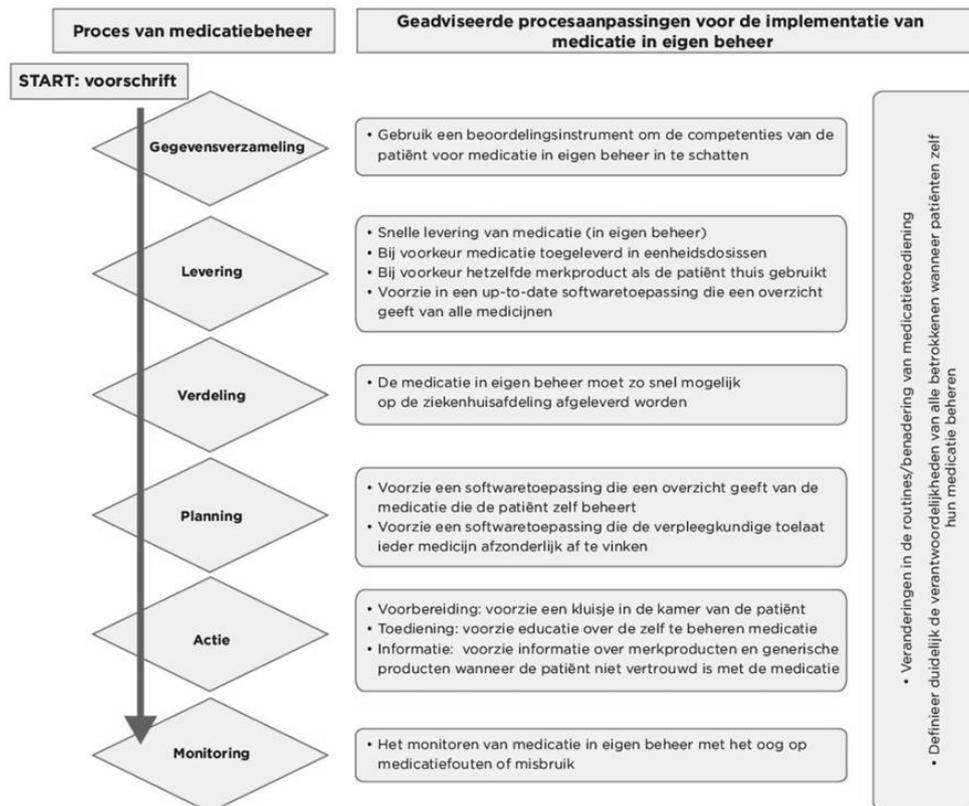
‘Wanneer krijg ik mijn medicijnen toegediend?’, is een vraag waarmee patiënten zitten. Beheren ze de inname zelf, dan moeten ze niet passief wachten, wat

hun gevoel van controle versterkt en leidt tot een tevredener patiënt.

Als verpleegkundigen minder tijd moeten besteden aan medicatie verstrekken, zou dat een tijdsbesparing kunnen betekenen. Anderzijds zal het ook hun taak zijn om de patiënt te leren goed met de medicatie om te gaan. Verpleegkundigen vragen zich af of dit in te passen valt in hun huidige drukke werkschema.

Sommige ziekenhuisapothekers en artsen maken zich zorgen over de veiligheid rond het zelf innemen van de medicatie door patiënten. Wat gebeurt er bijvoorbeeld als in het ziekenhuis generische middelen gebruikt worden, of andere merken dan de patiënt thuis neemt? Zullen ze deze herkennen? En als de patiënt deels zijn medicijninname zelf beheert, maar een deel door de verpleegkundige toegediend moet worden, leidt dat tot verwarring? Artsen wijzen ook op mogelijk misbruik van medicijnen zoals pijnstillers. Bepaalde medicijnen kunnen misschien zelfs gestolen worden door andere patiënten op de kamer. Artsen maken zich ook zorgen over fouten in de medicatietoediening die de resultaten van een behandeling kunnen beïnvloeden.

Maar het omgekeerde is ook mogelijk: patiënten kennen hun medicatie soms beter dan de verpleegkundigen en artsen. Een arts stelt dat in ziekenhuizen veel vergissingen gebeuren bij de toediening van medicatie, omwille van de vele stappen



▲ Benodigde veranderingen in het medicatieproces als gestart wordt met medicatie in eigen beheer.¹

die moeten worden doorlopen. Zelfmanagement geeft de patiënt de mogelijkheid zijn medicatie precies op het juiste moment te nemen. Dat kan de veiligheid van de patiënt net ten goede komen.

Een goed assessment van de patiënt en de complexiteit van de behandeling is vereist om na te gaan wie in aanmerking komt om zelf medicatie te beheren.

Conclusie

Medicatie in eigen beheer kan een goede praktijk zijn, mits aan een aantal voorwaarden is voldaan. Zo moeten patiënten:

- voor hun opname zelf hun medicatie beheerd hebben en nadien ook;
- gemotiveerd zijn en er mentaal en lichamelijk toe in staat zijn;
- hun deel van de verantwoordelijkheid nemen;

- goed op de hoogte zijn van het correcte medicijngebruik.

Daarbij moet het gaan om laagrisico-medicatie. Medicijnen met intraveneuze, subcutane of intramusculaire toediening komen niet in aanmerking voor eigen beheer van medicatie.

Een goed ontwikkelde softwareapplicatie is noodzakelijk om de medicatietoediening, door verpleegkundigen en patiënt zelf, goed te kunnen beheren en monitoren. Het logistieke proces moet daarbij duidelijk zijn: waar in de kamer worden de medicijnen bewaard, hoe worden ze gelabeld enzovoort. Elke verandering in het medicatieschema moet goed gecommuniceerd worden.

Patiënten zelf hun medicatie laten beheren gedurende hun hospitalisatie vraagt een aanpassing in de praktijk. De onderzoekers stellen dan ook een

stroomdiagram voor (zie hierboven) met enkele vereiste aanpassingen in het medicatieproces binnen ziekenhuizen, om zo zelfbeheer mogelijk te maken.¹

* **Toke Vanwesemael** is onderwijsassistent en doctoraatsstudent aan de Universiteit Antwerpen en de Thomas More Hogeschool, campus Lier. Het onderhavige artikel in Nursing is onderdeel van haar doctoraat. Meer info: www.NuPhaC.be, Toke.Vanwesemael@UAntwerpen.be, Tinne.Dilles@UAntwerpen.be.

Noten

- 1 Vanwesemael T, Boussery K, Dilles T. (2017) Self-management of medication during hospitalisation: Healthcare providers' and patients' perspectives. *Journal of clinical nursing*, doi 10.1111/jocn.14084.
- 2 Vanwesemael T, Van Rompaey B, Dilles T, et al. (2017). SelfMED: Self-administration of medication in hospital: A prevalence study in Flanders, Belgium. *Journal of Nursing Scholarship*,49(3), 277-285, doi 10.1111/jnu.12290.

List of abbreviations

List of Abbreviations

ADR	Adverse Drug Reaction
ATC	Anatomical Therapeutic Chemical classification
BCFI	Belgian Centre for Pharmacotherapeutic Information
CI	Confidence Interval
DRUGS	Drug Regimen Unassisted Grading Scale
JCI	Joint Commission International
MAEs	Medication Administration Errors
MM	Medication Management
MMU	Medication Management and Use
NHS	English National Health Service
NMC	Nursing and Midwifery Council
PODs	Patients Own Drugs
RCT	Randomized Controlled Trial
RPS	Royal Pharmaceutical Society
RR	Relative Risk
SAM	Self-Administration of Medication
SD	Standard Deviation
SHPA	Society of Hospital Pharmacists of Australia
SMM	Self-management of medication
SPSS	Statistical Package for the Social Sciences
SWOT	Strengths, Weaknesses, Opportunities and Threats
TAU	Treatment As Usual
WHO	World Health Organization

List of tables and figures

List of tables

Chapter 1

Table 1 The five dimensions of adherence

Chapter 3

Table 2 Ward characteristics

Table 3 Participant characteristics

Table 4 Medication management characteristics at level of the ward

Table 5 Medication management characteristics at level of the patient

Table 6 Influence of patient- or medication-related characteristics on self-administration of medication: logistic regression analysis

Chapter 4

Table 7 Characteristics of the interviewed groups per hospital

Table 8 Strengths of self-management of medication

Table 9 Weaknesses of self-management of medication

Table 10 Opportunities for self-management of medication

Table 11 Threats for self-management of medication

Table 12 Conditions for allowing self-management of medication

Table 13 Themes and subthemes of the SWOT-analysis

Chapter 5

Table 14 Flowchart of participants in the study

Table 15 Structured overview of the patient questionnaire

Table 16 Participant characteristics

Table 17 The attitude of patients towards self-administration of medication in hospital

Table 18 Relationship between patient characteristics and their attitude towards self-administration of medication

Table 19 Patients' perception of their own ability to self-administer medication in hospital

Chapter 6

Table 20 Demographic and work characteristics

Table 21 Characteristics on medication management

Table 22 The attitude towards self-administration of medication in hospital

Table 23 Prerequisites for self-administration of medication

Table 24 Consequences of self-administration of medication

Table 25 Supportive measures for self-administration of medication

Table 26 Competences for self-administration of medication

Chapter 7

Table 27 Demographics

Table 28 The inter-rater reliability of three question from the nurse's assessment

Chapter 8

Table 29	Nurse assessment
Table 30	Patient demographic data and medication management characteristics
Table 31	Characteristics of the self-managed medication
Table 32	Errors in patient self-management
Table 33	Feasibility of the SelfMED procedure concerning participating cardiologists

List of tables - appendices

Appendix II

Table A1	Differences in participant characteristics between men and women
Table A2	Reasons for prohibiting or allowing self-administration of medication

List of figures

Chapter 1

Figure 1	Orem's General Theory of Nursing
Figure 2	Conceptual model of the relationships between self-care, self-management, self-monitoring, symptom management and self-efficacy.
Figure 3	The medication self-management model
Figure 4	Self-administration of medicines by patients in hospital

Chapter 4

Figure 5	Advised changes in the medication management process for implementing self-management of medication.
----------	--

Chapter 5

Figure 6	Willingness of patients to self-administer medication in hospital
Figure 7	Relationship between willingness to self-administration of medication and the overall attitude towards self-administration of medication.
Figure 8	Prerequisites for self-administration of medication.
Figure 9	Consequences of self-administration of medication.

Chapter 6

Figure 10	Willingness of healthcare providers to allow self-administration of medication in hospital
-----------	--

Chapter 8

Figure 11	Flowchart of the participating patients in the study
-----------	--

List of figures - appendices

Chapter 7

- Figure A1 Development and validation of the SelfMED procedure
- Figure A2 The SelfMED flowchart
- Figure A2 The SelfMED procedure

Curriculum Vitae

Curriculum Vitae

Personal information

Surname Vanwesemael
First name Toke
Address Zammelseweg 6
2440 Geel
Day of birth December 14, 1990
Nationality Belgian
Telephone +32 474 96 59 18
E-mail toke_vw@hotmail.com
LinkedIn www.linkedin.com/in/tokevanwesemael

Education

Period 09/2014 - 12/2018
Institution University of Antwerp
Field of study **Doctor in Medical Sciences**

Period 09/2011 - 06/2013
Institution University of Antwerp
Field of study **Master in Nursing and Midwifery**

Period 09/2008 - 06/2011
Institution Katholieke Hogeschool Kempen
Field of study **Bachelor in Nursing**

Period 09/2016 – 06/2017
Institution CVO Hoger Instituut der Kempen
Field of study **Specific teaching education - proof of pedagogical competence**

Professional Experience

Period 05/2016 – current
Employer University of Antwerp
Job function **Teaching assistant - Master in Nursing and Midwifery**

Period 09/2013 – 06/2018
Employer Sint Aloysius-Institute for Nursing
Thomas More University College department of Nursing
Job function **Lecturer/ Internship supervisor / Support during BSc thesis**

Period 09/2014 – 06/2016
Employer Thomas More University College department of Nursing
Job function **Scientific researcher – SelfMED project**

Period 02/2012 – 06/2013
Employer Sint-Dimpna Regional Hospital
Job function **Nurse - operating theater**

Competences

Languages

Dutch	Mother tongue
English	Fluent
French	Basic

Software

Microsoft Office	Excellent
Statistical Package for the Social Sciences	Good
Nvivo	Good

Relevant additional courses

Winter course "Qualitative research: from research question to publication" February – April 2015, University of Antwerp

Workshop "Multivariate Data Analysis", March 2016, StatUA

Writing Academic Papers, Mai – June 2016, Linguapolis - University of Antwerp

Writing Publicity Publications, February 2017, University of Antwerp

Scientific activities

Publications

Peer reviewed articles

- Vanwesemael, T., Van Rompaey, B., Petrovic, M., Boussery, K., Dilles, T. (2017). SelfMED: Self-Administration of Medication in Hospital: A Prevalence Study in Flanders, Belgium. *Journal of Nursing Scholarship*, 49(3), 277-285.
doi:10.1111/jnu.12290
- Vanwesemael, T., Boussery, K., Manias, E., Petrovic, M., Fraeyman, J., Dilles, T. (2017). Self-management of medication during hospitalisation: Healthcare providers' and patients' perspectives. *Journal of Clinical Nursing*.
doi:10.1111/jocn.140847
- Vanwesemael, T., Boussery, K., van den Bemt, P., & Dilles, T. (2018). The willingness and attitude of patients towards self-administration of medication in hospital. *Therapeutic Advances in Drug Safety*, 9(6), 309-321.
doi:10.1177/2042098618764536
- Vanwesemael, T., Dilles, T., Van Rompaey, B., & Boussery, K. (2018). An Evidence-Based Procedure for Self-Management of Medication in Hospital: Development and Validation of the SelfMED Procedure. *Pharmacy (Basel)*, 6(3).
doi:10.3390/pharmacy6030077
- Vanwesemael, T.; Boussery, K.; Jordan S.; Van Rompaey B.; Dilles, T. (2018) The SelfMED procedure –self-management of medication on a cardiology ward: administration errors, registration errors and feasibility. [submitted]
- Vanwesemael, T.; Boussery, K.; Dilles, T. Patient self-administration of medication in hospital: current state of the art of an intervention in line with the fundamental principles of the nursing profession. *Nursing Science Quarterly* [submitted]

Not peer reviewed articles

Medicatie in eigen hand. Auteurs: Toke Vanwesemael, Tinne Dilles, Nursing, Uitgeverij Bohn Stafleu Van Loghum, 2015, p10-12

Medicatie in eigen beheer: werkt dat? Auteurs: Toke Vanwesemael, Tinne Dilles, Nursing, Uitgeverij Bohn Stafleu Van Loghum, 2018, p 10-11

Conferences

1. Poster presentations

- Self-administration of medication in hospitals: a prevalence study. November 2014, Ghent
- Self-administration of medication in hospitals: a prevalence study. CARE4 February 2015, Antwerp
- Self-administration of medication in hospital: a prevalence study. University of Antwerp research day April 2015, Antwerp
- Self-administration of medication in hospitals: a prevalence study. “Trefpunt Verpleegkunde” Mai 2015, Brussels
- SelfMED: Self-administration of medication in hospital. A prevalence study in Flanders, Belgium. Innovation for Health February 2016, Rotterdam (The Netherlands)
- An evidence-based procedure for self-management of medication in hospital: development and validation. 22nd International Nursing Research Conference November 2018 Córdoba (Spain)

2. Oral presentations

- Self-administration of medication during hospitalization: Benefits versus organizational challenges. “Week van de Verpleegkunde” NVKVV March 2016, Kursaal Ostend
- SelfMED: Self-administration of medication in hospital. A prevalence study in Flanders, Belgium. STTI Conference June 2016, Utrecht (The Netherlands)
- Self-administration of medication in hospitals: a prevalence study. CARE4 February 2017, Antwerp
- Self-administration of medication in hospitals – SelfMED “Week van de Verpleegkunde” NVKVV March 2017, Kursaal Ostend
- Self-administration of medication in hospitals – SelfMED. 20th anniversary Department of Geriatrics, University Hospital Ghent April 2017, Ghent
- Self-management of medication after hospital discharge. 22nd International Nursing Research Conference November 2018 Córdoba (Spain)
- Self-management of medication in hospital: a pilot test of the SelfMED procedure. 22nd International Nursing Research Conference November 2018 Córdoba (Spain)

Awards

- BSc thesis “De angstige preoperatieve patiënt”, nominated for the Flemish Thesis Price 2011.
- MSc thesis “Peilen naar de aanwezigheid van het Magnet Hospital Concept en de invloed van de werkomgeving op burn-out en engagement in woonzorgcentra”, winner of the “Ereprijs Gerebern ‘Benny’ Laenen” 2013.
- University of Antwerp research day, April 2015. Winner of the price for the best poster presentation; Poster: “Self-administration of medication in hospital: a prevalence study.”.

Other

Member of the NuPhaC team - Nurse and Pharmaceutical Care, www.nuphac.eu

Dankwoord

Het is eind november, de dagen worden korter en de avond valt elk dag net iets sneller. Een gevoel van nervositeit bekruipt mij. Nog luttele weken en de gekste rit van mijn leven komt stilaan tot zijn einde...

Sinds september 2014 schrijf ik aan een verhaal, een verhaal waarvan ik nooit had durven dromen. Wat begon als een doordeweeks gesprek met Prof. Dr. Tinne Dilles - nota bene in een klein zolderlokaal van de Thomas More hogeschool te Lier – eindigde enkele maanden later in een deeltijdse job als wetenschappelijk onderzoeker in het kader van het SelfMED onderzoek. Dit was namelijk nog niet alles... Er was een mogelijkheid om met de basis van het SelfMED onderzoek een doctoraat aan te vatten. 'Of ik dat eventueel zag zitten?' was de vraag. Jong, voorzien van veel vrije tijd, nog veel meer goesting en moed om hieraan te starten ging ik de uitdaging aan. Ik vertel je nu met absolute zekerheid... Ik had écht géén idee wat me te wachten stond.

Gelukkig sta je er als doctoraatsstudent nooit alleen voor, zowel Prof. Dr. Tinne Dilles als Prof. Dr. Koen Boussey namen de rol van promotor op. In dit dankwoord zou ik dan ook graag willen starten met hen te bedanken. Tinne en Koen, dankjewel voor jullie kritische blik, eerlijke woorden en alle uitdagingen die jullie mij voorschotelden. Het was een eer om zo nauw met jullie te mogen samenwerken. Woorden kunnen niet omschrijven wat ik allemaal van jullie heb mogen leren.

Niet enkel kon ik rekenen op twee gouden promotoren, het netwerk achter het SelfMED onderzoek voorzag mij steeds van de nodige vleugels. Ik wens dan ook mijn dank uit te drukken aan het Heilig Hart Ziekenhuis te Lier, het Universitair Ziekenhuis Gent, het Universitair Ziekenhuis Antwerpen, Dr. Mirko Petrovic, Paul Van Aken, Rik Verhaeghe, Dirk Van der Auwera en Bernard Beke, de deelnemers van de SelfMED resonantieraad en alle andere partners waarmee mijn weg mocht kruisen.

Een onderzoeker is niets zonder data... Het is ongelooflijk hoeveel personen bereid waren om deel te nemen aan de gevoerde onderzoeken, interventies en interviews. Ieders bijdrage was een cruciale bouwsteen, dankjewel. Met een rugzak vol bouwstenen en de ondersteuning van alle co-auteurs timmerden we aan een hele reeks manuscripten. Uit de grond van mijn hart, aan alle co-auteurs, een welgemeende dankjewel voor jullie meningen en diverse visies op het onderwerp.

Het is erg duidelijk, doctoreren doe je niet alleen. In de afgelopen jaren had ik steeds de steun van prachtige mensen. Op de trein van Lier naar Geel heb ik Lien, Ines en Roel meermaals overvallen met eindeloos geratel, dat ging dan meestal over deadlines, medicatie en ziekenhuizen. Dankjewel om steeds te willen luisteren, jullie mening te geven en op eender welke wijze mij te laten geloven dat alles wel goed zou komen. Op 'de bureau' in Antwerpen, daar zaten mijn andere sparring partners. Bart, bedankt voor jouw eindeloze vragenrondes, cryptische benaderingen en wijze woorden. Filip, Elyne en Kelly... misschien kregen jullie het wel het hardst te verduren. Onze afgelopen jaren waren gevuld met goede discussies, fijne congressen, een portie gelach en gezwans, geratel of geklaag en soms ook gezaag. Ik heb mogen ervaren dat jullie er steeds waren en dat gevoel was meer dan hartverwarmend. Lotgenoten, bedankt.

Bij de start van mijn doctoraat had ik geen idee van datgene waar ik aan zou beginnen. Ik wist niet dat vele weekends, vrije uren en vakanties gevuld zouden worden met schrijven, analyseren, herschrijven en opnieuw analyseren. Ik besepte niet hoeveel uren de datacollectie in beslag zou nemen, hoeveel kilometers ik in mijn wagen zou doorbrengen en hoeveel uren ik bezig zou zijn met het bestuderen van

literatuur. Het feit dat ik dit kon, is te danken aan vele personen rondom mij... Vooreerst zou ik mijn ouders willen bedanken. Zij brachten mij de basis bij, ondersteunden mij in de aanloop naar mijn doctoraat. Zonder het begin dat zij in het verleden maakten, zou hier in het heden geen doctoraatsboekje liggen. In de afgelopen jaren stonden jullie steeds klaar, werden meerdere porties soep, vol-au-vent en stoofvlees voorzien en verdween geregeld een volle mand strijk. Bij uitbreiding wil ik mijn familie en vrienden bedanken, ook jullie ondersteunden steeds waar jullie dat konden. Bemoedigende woorden en een schouderklopje waren nooit veraf. De vragen 'Hoe gaat het met je doctoraat?', 'Ga je dan dokter worden?' konden me steeds doen glimlachen en gaven me een warm gevoel. Dankjewel!

Als laatste mogen de twee belangrijkste personen in mijn leven niet ontbreken in dit dankwoord. Lieve kleine Jules, officieel een PhDbaby... Jij bent niet enkel mijn, maar ook papa's lotje uit de loterij. Dankjewel, om bij momenten mijn volledige aandacht op te eisen en mij netjes met beide voeten op de grond te houden. Daan, mijn rots, de rust zelve en een eeuwige positivo. Jij was er steeds en dat was precies wat ik nodig had, dankjewel.

"Kind words can be short and easy to speak, but their echoes are truly endless."

Mother Teresa

