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Medication management in patients with diabetes

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Introduction

Chapter 01

INTRODUCTION

Case

Mary is a 52-year-old woman with type 2 diabetes, hypertension, heart arrhythmias and severe fatigue. Her diabetes is treated with metformin and tolbutamide and she receives another five medications to treat her other conditions. Mary lives together with her husband and has a paid job for three days a week and works both day- and night time shifts. Mary's husband also has a part-time job and suffers from severe COPD, hypertension and heart arrhythmias. Although they are a great support to one another, Mary cannot seem to fit in her medication and lifestyle adaptations into daily life to get her diabetes under control. Mary's HbA1c level is 70 mmol/mol and the nurse practitioner discusses with her the option to start insulin. Mary is a bit hesitant about starting insulin because of the possibility to gain weight after starting insulin. Also, she fears having to use insulin does not always fit in her work schedule.

Mary decides to consult her pharmacist to ask for advice about her medication. They discuss her medication therapy and the difficulties she experiences. Because of her job, Mary does not have a regular eating pattern and often forgets her metformin at noon. Her pharmacist suggests to change her metformin from three times to twice daily and to adjust the daily dose if necessary. For her medication management problems, the pharmacist proposes to start a multidose drug dispensing system to assist her with her oral medication. Also, the pharmacist introduces Mary to a diabetes support program that has recently started in the healthcare centre her pharmacy, general practitioner (GP) and nurse practitioner are based. The program includes a physical activity and dietary plan and informal information gatherings for patients with diabetes. This diabetes support program is a collaboration between different primary care providers. Mary signs up for the program and her pharmacist discusses the dose adjustment of metformin with her GP.

Treatment of diabetes

Mary is one of the many patients suffering from diabetes. Worldwide, one in eleven adults is diagnosed with diabetes – placing diabetes among the major causes of death – and this number is likely to increase further.[1–3] There are different types of diabetes, with the two main types diabetes mellitus type 1 and diabetes mellitus type 2. Diabetes mellitus type 1 is an auto-immune disease in which patients always require insulin therapy. Patients with diabetes mellitus type 1 are treated by specialists in a hospital setting.[4] The majority of patients with diabetes suffer from diabetes mellitus type 2, as is Mary. The disease characterizes itself with insufficient insulin secretion and insulin resistance in liver-, muscle- and adipose tissue. Patients can develop

diabetes mellitus type 2 due to unhealthy lifestyle habits but it can also be developed by just getting older.[5] Typically, patients with diabetes mellitus type 2 are treated in primary care. In this thesis the focus lies on patients diagnosed with diabetes mellitus type 2.

The treatment of diabetes mellitus type 2 is a combination of lifestyle adjustments and medication therapy.[6] The clinical focus of controlled diabetes is on glycosylated haemoglobin (HbA1c). HbA1c measurements not within the clinical target range are related to an increased disease burden for patients due to higher risks of multimorbidity, complications, mortality and a lower quality of life.[7–14] However, the treatment of diabetes should reach a level of HbA1c control to balance the risk for long-term complications and the risk of harm, e.g. hypoglycaemia. This all depends on patient characteristics and targeted treatment goals.[15]

In the Dutch setting, uncomplicated diabetes mellitus type 2 is treated in primary care through diabetes care groups. In this structure, a group of primary healthcare providers together share the responsibility for the chronic diabetes care.[16,17] Clinical care is mainly organized in the general practice. After diagnosis of diabetes, the GP initiates treatment or, for more severe cases, refers to a medical specialist for further treatment. In this thesis, we focus on patients treated primarily in the primary care setting. Depending on severity of the out of range HbA1c values, treatment starts either with just lifestyle adaptations or directly in combination with medication therapy. At the start of treatment, patients are closely monitored by both GP and nurse practitioner or diabetes nurse. Once patients are set on their therapy, they have three-monthly appointments with the nurse practitioner or diabetes nurse and yearly appointments with the GP. The nurse discusses clinical parameters, general well-being and possible barriers for implementing lifestyle adaptations and medication use with the patient. During the yearly GP consultation, a more thorough check-up is performed including screening for diabetes related complications.[5] Pharmacists follow-up on medication use in patients with diabetes. Besides dispensing medication, they have a role in identifying medication related problems – biomedical and patient-related – and they support patients with their blood glucose monitoring devices and insulin pens.[18] In addition they may perform a yearly multidisciplinary medication review following the Dutch guideline.[19]

Medication management

Medication management is the monitoring, evaluation and optimization of medication used by a particular patient and is a multidisciplinary effort between patient, pharmacist and physician. [20,21] Medication management becomes more challenging with an increasing treatment complexity, like diabetes treatment. For patients with diabetes, medication management becomes even more complex due to the high likelihood of multimorbidity and polypharmacy

among these patients.[13,14,22,23] Over the course of a patient's life, medication management becomes even more important, as the prevalence of diabetes, multimorbidity and polypharmacy are all associated with each other as well as with an increasing age.[1,24–29]

One can imagine that the complexity of medication management in patients with diabetes might lead to errors in use which are more likely in patients on polypharmacy - the concurrent use of five or more chronic medications.[30] Furthermore, it is important to assess at the appropriateness of medication.[31] Medication related problems are common among patients with diabetes and can occur on both prescription- and patient level. Problems on prescription level include choice of medication, dosing and drug-drug interactions. Problems on patient level include adverse reactions, administration, adherence to medication, awareness of health and disease and satisfaction with therapy.[32–36] Patients seek information from the internet and from healthcare providers when experiencing a medication related problem.[37] Though, the exact actions patients with diabetes undertake in relation to the various types of problems they experience and the role of healthcare providers – pharmacists in particular – in this are largely unknown.

Pharmacists' role in diabetes medication management

Mary has consulted her pharmacist with a question about alternatives for the use of insulin after the discussion with her nurse practitioner. Mary had previously experienced the expertise of her pharmacist when she suffered from side effects of her ACE inhibitor and therefore went to her pharmacist again with a medication related question.

Pharmacists are the experts when it comes to medication and they have the responsibility of both dispensing medications and providing guidance to patients for appropriate use of their medications.[38] This is especially important for medications prescribed with the intention of chronic use as non-adherence to medication therapy has a negative impact on patients' health outcomes.[39,40] Translating this to patients with diabetes, uncontrolled diabetes could lead to increased risks of a lower quality of life, additional morbidities and mortality.[7–14] Pharmacists' guidance in medication management starts with the first prescription a patient collects, as many patients do not return to the pharmacy to refill their prescriptions for chronic medications.[41–43]

Many different pharmacists' approaches have been developed over the past years to improve patients' medication therapy and health outcomes. Pharmacists have proven their added value in improving prescribing of new medications and identifying and solving medication related problems in patients transferred from hospital care to primary care.[44,45] These interventions focus on medication use at a particular moment in time. Other pharmacist interventions have a longitudinal approach and focus on chronic disease and medication management in patients to improve both clinical- and patient reported outcomes, including interventions specifically

focussing on patients with diabetes.[46–49] Especially the role of pharmacists in clinical medication reviews (CMRs) has become common practice in primary care. The goal of a CMR is to optimize medication use by means of assessing the appropriateness of medication therapy and patients' experiences, expectations, concerns and beliefs related to the therapy.[50,51] CMRs are mainly beneficial for patients with complex medication schemes, polypharmacy and multimorbidity as these factors influence patients' medication management.[25,52–54] Making patients with diabetes ideal candidates for a CMR.

However, there are still questions about the exact role pharmacists take upon for patients with diabetes regarding effective interventions and the identification of medication management issues.

Patients' role in medication management

Mary was able to think about the therapy proposal her nurse made and to consult her pharmacist to request additional information. However, this is not common to all patients and requires a certain level of self-management skills in patients.

The day-to-day medication management is strongly dependent on patients' behaviour, as patients only have contact with their healthcare providers a couple of times a year.[55] Medication management is one of the aspects of patients' self-management.[56] Self-management can be defined as “the individual's ability to manage the symptoms, treatment, physical, and psychosocial consequences and lifestyle changes inherent in living with a chronic condition. Efficacious self-management encompasses the ability to monitor one's condition and to effect the cognitive, behavioural, and emotional responses necessary to maintain a satisfactory quality of life.”.[57,58]

The level to which patients are able to perform self-management depends on patients' individual and environmental characteristics, including health literacy, physical health, illness perception and social support.[59–61] All these factors influencing patients' chronic disease management are graphically presented in the Cycle of Complexity Model (Figure 1).[62] Patients' characteristics are divided into five sections with patients' 'Preferences & Expectations' in the centre, shaping their behaviour in healthcare and perceptions of health influencing medication management behaviour. These 'Preferences & Expectations' directly affect the sections 'Acute Shocks & Medical Events', 'Capacity & Resilience', 'Access & Utilization' and 'Workload'. 'Acute Shocks & Medical Events' is the section that can be influenced the least by patients and healthcare providers as it includes unanticipated events affecting patients' health and well-being. 'Capacity & Resilience' includes resources supportive to manage one's medications. 'Access & Utilization' describes the accessibility of healthcare to patients, both physically and mentally. 'Workload' considers

patients effort to be taken to manage all daily activities. All sections are subjected to changes over time and can affect patients' burden of treatment and burden of disease both negatively and positively.[62] The sections in which pharmacists can make a difference within this model are to optimize patients' 'Access & Utilization' of healthcare and to equip patients with tools to increase their 'Capacity & Resilience' and decrease their experienced 'Workload'.

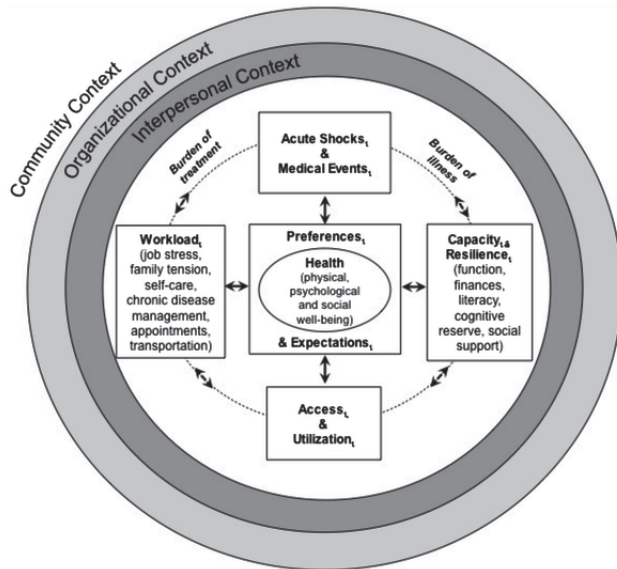


Figure 1: Cycle of Complexity Model[62]

Pharmacist-patient communication

Mary presented her problems rather clearly to her pharmacist, giving the pharmacist a direct lead to pursue a solution. Though, often patients are less explicit when describing an experienced problem.[63,64] To reveal these problems, pharmacists need a certain set of communication skills.

Communication between pharmacists and patients is important for sufficient medication management. Without adequate communication it is difficult for both patients and pharmacists to send and receive information, including sharing problems and offering support. One of the situations pharmacists' communication skills are key is during a CMR related patient-interview. Communication skills are of influence on assessing patients' medication use and unravelling possible medication related problems as pharmacists often conduct these patient-interviews.

[50,51] But communication skills are also important in offering support. Communication on its own – without assessing the content of what is communicated – can already be beneficial for patients’ disease- and medication management.[65] Powerful elements in communication are influencing patients’ expectancies and affect manipulation.[65,66] These elements can be best implemented with a patient-centred communication strategy.[67] This active involvement of patients contributes to improved patients’ health outcomes.[68]

Studies on the effect of pharmacist-patient communication on patient outcomes in intervention studies remain limited.[69] There is proof that pharmacists’ communication quality is positively associated with patient-centred counselling.[70] However, only limited research has been performed on pharmacists’ communication behaviour in relation to discussing patients’ medication management and possible problems concerned with this.

AIM OF THIS THESIS

In summary, diabetes is a worldwide burden on patients’ quality of life and the healthcare system. An important part of adequate diabetes management is medication therapy. Community pharmacists are the medication experts in primary care and should have a significant role in continuous medication management for patients with diabetes. However, this long-term role in patient care is new for pharmacists and limited research has been done evaluating this.

The aim of this thesis is to explore how the role of the pharmacist in medication management in patients with diabetes, in particular older patients with diabetes mellitus type 2, can be enhanced. Within five chapters, different aspects of medication management from both patient- and pharmacist perspectives have been investigated. **Chapter 2** describes the diabetes population treated in primary care in terms of controlled, uncontrolled and mixed controlled diabetes based on HbA1c measurements over a two-year period. Also, we have performed a multinomial logistic regression analysis to assess patient characteristics associated with uncontrolled and mixed controlled diabetes. In **Chapter 3** the role of the community pharmacist in self-management in patients with diabetes has been summarized in a systematic literature review. We have performed meta-analyses to measure the effect of pharmacist-led self-management interventions on clinical- and patient-reported diabetes outcomes. **Chapter 4** explores the problems experienced by patients with diabetes, both from a patient and healthcare provider perspective. Qualitative interviews were conducted to explore type of problems, sources of support and information and the role of healthcare providers in identifying problems. **Chapter 5** and **6** describe an observational study of clinical medication review interviews. In **Chapter 5**, the focus is on what kind of problems patients address during a medication review interview. **Chapter 6** describes the verbal interaction between patients and pharmacists. We explored how patients address problems

– cues and concerns – and pharmacists’ response behaviour to these cues and concerns. Finally, in the general discussion all results of this thesis are summarized and we reflect on how these results can help improve medication management support from a pharmacists’ perspective, the role of patients in this and how this can be translated to practice.

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