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Quality of prescribing in chronic kidney disease and type 2 diabetes

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GENERAL DISCUSSION AND CONCLUSION



Chronic kidney disease (CKD) and type 2 diabetes (T2D) are conditions with a potentially high burden of disease. The impact of both conditions worldwide, in terms of prevalence, suffering of patients, and costs for society is substantial.¹⁻⁵ These conditions also carry a high burden of treatment. Pharmacotherapy with proven long-term favourable effects is a major pillar of chronic disease management in these conditions. It can ameliorate the burden of disease by preventing or delaying complications, in case of CKD macrovascular complications, in case of T2D both microvascular and macrovascular complications.^{6,7} Preventing or delaying complications contribute to maintaining or even improving quality of life on the longer term.⁸ Discussion remains with regards to the short-term effects of specific medication and the extent of the effect of total medication burden on quality of life.

Pharmacotherapy in these conditions is complex, and comprises control of multiple intermediate targets, including blood pressure, dyslipidaemia, in CKD patients the management of proteinuria, anaemia, and electrolyte imbalances, and in T2D glycaemic control.⁹⁻¹² To achieve the overall treatment aims of risk reduction and better quality of life in an individual, quality of prescribing should be optimal and preferably personalized, albeit based on broad assumptions with regards to beneficial therapies. Strategies to monitor and, where required, improve prescribing quality will be useful and sometimes imperative to improve overall outcomes in patients.¹³

One way of assessing the prescribing quality in quality improvement initiatives is by the use of prescribing quality indicators (PQIs). PQIs assess whether patients are prescribed the recommended medication according to the guidelines (appropriate prescribing) and do not receive medication that is not needed or potentially unsafe (inappropriate prescribing). In this way, PQIs give insight in the prescribing behaviour of healthcare providers.¹⁴ PQIs need proper development and validation before they can be used to assess the quality of prescribing.¹⁵ When proper actions are taken with regards to the findings of the PQIs, they can contribute to an improved quality of prescribing.¹³

This thesis focuses on the development and validation of two sets of PQIs: one for CKD and one for T2D care. Implementation of these sets in practice will facilitate further steps towards better assessment and improvement of treatment quality.

The set for CKD care comprises sixteen PQIs which showed to have content and face validity. All showed operational validity in primary care, although with some PQIs information was available of only a small number of patients. After excluding two indicators with too few eligible patients, ten out of fourteen PQIs showed

operational validity in secondary care. The remaining four indicator required differentiation in albuminuria which was not possible with the extracted data.

The set for T2D care comprises twenty PQIs, including eight clinical action indicators, which showed to have content, face and operational validity in primary care. On top of that, all clinical action indicators and one of the three tested PQIs on current use showed predictive validity when tested for associations with intermediate patient outcomes. No associations were found between the three PQIs on current use and four PQIs on medication safety with improved or lower quality of life.

STRENGTHS OF THE NEWLY DEVELOPED SETS OF PRESCRIBING QUALITY INDICATORS

Our newly developed sets of PQIs have several strengths over previously developed quality indicators for CKD and T2D. First of all, although this may sound obvious, a strong point of our sets is that they focus on prescribing, which is a process of care. Processes are easier to change and improve compared to, for example, structure or outcomes of care, which can also be assessed with quality indicators. The prescribing process is a direct action of the healthcare provider, which is relevant to monitor in quality improvement initiatives.

Secondly, previously developed and used PQIs are mainly volume-based indicators, such as the indicators from the Dutch Monitor Prescribing Behaviour General Practitioners.¹⁶ Volume-based indicators focus on prescriptions of certain drugs or drug classes among the whole patient population or prescriptions of preferred drugs among a class of drugs. They are mainly drug- and disease-oriented indicators. These indicators do not necessarily reflect quality of prescribing. The new PQIs described in this thesis include per indicator only eligible patients, for whom the treatment is recommended (or not recommended) in the current clinical guidelines, based on available information on patient characteristics. They are patient-oriented indicators and intended to assess the quality of prescribing according to guidelines. Although PQIs assess quality of prescribing at a population level, due to these restricted inclusion of patients, the PQIs take into account the shift towards more individualized care.

Thirdly, our PQI set for T2D includes clinical action indicators. These clinical action indicators are thought to be more informative for healthcare providers than volume-based or cross-sectional indicators.¹⁷ Volume-based or cross-sectional indicators, that calculate the amount of current prescriptions, may stimulate overtreatment. Furthermore, cross-sectional indicators only focus on one point in

time, thereby neglecting the longitudinal nature of chronic care which is needed in CKD and T2D patients. Clinical action indicators are also considered more informative than currently used outcome indicators that focus on numbers of T2D patients achieving target levels.¹⁸ Such outcome indicators do not differentiate between patients who receive suboptimal care and those who are difficult to manage.^{18,19} So far, clinical action indicators for T2D have mainly been used for research purposes.²⁰⁻²³ They have not yet been used in quality improvement initiatives to assess and improve the quality of prescribing. This may in part be due to their complex definitions. The newly developed PQIs, including the clinical action indicators, have been developed and defined in such a way that they can be implemented in quality improvement initiatives and used in daily practice.

Finally, our sets of PQIs include several indicators on prescribing of potentially inappropriate medication. There are lists of indicators or criteria focusing on potentially inappropriate prescribing in elderly²⁴ and CKD²⁵, but for T2D such indicators were not included in previous indicator sets for routine assessments.^{26,27}

CURRENT CONCERNS REGARDING PRESCRIBING QUALITY INDICATORS

More and more quality indicators are being developed and this thesis partly adds to the number of existing quality indicators. The growing amount of indicators has fuelled the current debate around issues with the data availability, data reliability and usefulness of the indicators.

Data availability concerns the effort it takes to measure, note down, extract and assess clinical information needed to be transformed into quality indicators. The sets of PQIs developed in this thesis are tested on whether it is possible to measure them with the data that are routinely collected and available for quality assessment. This is the operational validity and we concluded that the majority of the PQIs in both sets have this validity, although in some cases the number of eligible patients was very small. This means that there is no extra effort needed to collect data for our PQIs. However, there might be extra effort needed to organise or restructure the extracted data to enable the calculation of the PQIs.

Furthermore, the available data need to be reliable in order to ensure that the indicators correctly reflect the quality of prescribing. The registration of the required variables, such as laboratory measurements and prescription data, should be as complete as possible without errors. The more complete the data are, the more the PQIs reflect the actual quality of prescribing. In this thesis we used both data from validated databases, such as the Groningen Initiative to Analyse Type 2 Diabetes Treatment (GIANTT) database, and data directly from clinical practice.

The amount of missingness differed per database and was lower for validated databases. For indicators that need information about, for example, albuminuria, calcium or phosphate levels, missing data lead to the risk of selection bias.

Finally, well developed and validated indicators are useful to give insight in the quality of care and the possibilities for improvements. Our PQIs were developed to give relevant insights into the prescribing behaviour of healthcare providers, which was confirmed by their face validity. First pilots in practice indicate that our PQIs are of interest for the healthcare providers because of the novel approach of assessing prescribing quality. Quality of prescribing was not assessed in this way before in CKD and T2D patients.

Thus, we expect that the information gained from assessing the quality of prescribing with the newly developed PQIs can be used in future quality improvement initiatives to improve the quality of prescribing in CKD and T2D patients.

PRESCRIBING QUALITY INDICATORS IN PRACTICE

In general, quality indicators can be used for internal and external evaluation. Examples of internal evaluation are audit-and-feedback programs. Our PQIs can be used in such programs to provide feedback to healthcare providers to make them aware of their performance. Such mirroring can be used to compare healthcare providers and give feedback on the individual, organisational, regional or national level.²⁸ Our PQIs, specifically the clinical action indicators, are very suitable to identify patients with a possible suboptimal treatment at the individual level, but they can also be used at a higher level, for example, by professional organisations.

As stated by the Health Council of the Netherlands (Gezondheidsraad), quality of care should be made visible.²⁹ This visibility can be established by using quality indicators in external evaluation. In the Netherlands, hospitals are obliged to report information on the quality of care to the National Health Care Institute (Zorginstituut Nederland). The quality of care is assessed through a set of indicators and the outcomes are accessible online.³⁰ Patients can use the information to make informed choices about care. The Health Care Inspectorate (Inspectie voor de Gezondheidszorg) uses the information to monitor the quality of secondary care. For primary care, there is the annual Dutch Monitor Prescribing Behaviour General Practitioners.¹⁶ This benchmark currently includes 30 indicators making use of routinely available prescription data. General practitioners can get access to compare their own scores with regional or national scores.

Another way of using PQIs in external evaluation is to use them in pay-for-performance systems. An example of such a system is the Quality Outcomes Framework (QOF) in the United Kingdom.²⁷ In short, this is an initiative using quality indicators to monitor general practitioners and reward them based on their performance. It is shown that the inclusion of CKD and T2D in the QOF has led to higher awareness, better management and improved outcomes in these patients.³¹⁻³³ Also, in The Netherlands, health insurance companies have contracts with partners in primary care that incorporate rewarding based on quality indicators. There is, however, a problem with setting the right benchmarks for rewarding. In the QOF, patients can be excluded from the calculation if the indicated treatment is clinically inappropriate. Some propose that when these exceptions are made, the benchmark of these indicators should be set at 100%, i.e. 100% of included patients should receive the recommended care.³⁴ Although our PQIs specify the patient population to those for whom the treatment is recommended, a score of 100% is usually not possible and in most cases definitely undesirable.

Quality indicators only assess whether recommendations in guidelines are followed in general. In fact, the daily practice of medicine is composed of elements of evidence-based, preference-based and practice-based medicine.³⁵ In this way, evidence as reflected in the guidelines is combined with the preferences and needs of individual patients, and the experiences and skills of the healthcare provider. Factors, such as the occurrence or fear for side effects of the drug or not responding to the drug, can justify refraining from prescribing the treatment as recommended by guidelines. As mentioned, in the QOF these reasons can be documented to exclude such patients from the indicators. Registration of all possible aspects will lead to more registration burden, which is unwanted for clinical practice. Still, if 100% is not the benchmark, it remains difficult to set the 'right' benchmark. We have not assessed the optimal benchmark for our PQIs, and therefore, one should be careful to use absolute and maximal results of these PQIs in benchmarking programs as being the optimal result.

Instead, using the PQIs in peer comparison, taking notice of major confounding factors in the included population, would be a sensible approach. In such comparisons, differences should be seen as reasons for further inspection and not as results that can easily be interpreted as being right or wrong.

FUTURE PERSPECTIVES

In this thesis several steps are described toward improved assessment of quality of prescribing. However, there are further steps to take toward the optimal assessment of quality of prescribing.

Predictive validity

Several of the PQIs for T2D care have content, face, operational and predictive validity, and are therefore ready for implementation in quality improvement initiatives. The other PQIs for T2D care and the PQIs for CKD care were yet not tested on predictive validity or, in the case of the PQIs on current prescribing of RAAS-inhibitors, showed no predictive validity. Some of the PQIs, such as the indicators on preferred drug use, may not be associated with clinical outcomes, but could be associated with adverse drug events, better quality of life or other outcomes. The predictive validity of the remaining PQIs would ideally be tested in a cohort study of CKD or T2D patients. Possible patient outcomes to be tested for the other PQIs for T2D care should include the intermediate patient outcomes, such as glycated haemoglobin, low-density lipoprotein-cholesterol, blood pressure and albuminuria, but also adverse events, health-related quality of life and other measures assessing patient perspectives. Similarly, the patient outcomes for the PQIs for CKD care could include kidney function, low-density lipoprotein-cholesterol, blood pressure, phosphate levels, adverse events, health-related quality of life and other patient perspectives. Adverse events might also be linked to the PQIs on potential inappropriate prescribing.

Testing for possible associations with hard patient outcomes, such as cardiovascular disease, end-stage renal disease or death, belongs to the possibilities but is not a prerequisite to give the PQIs predictive validity. For many drug treatments, studies have shown that the intermediate patient outcomes are predictive of hard patient outcomes. This scientific evidence resulted in the clinical guideline recommendations used for our PQIs.^{10,11} Therefore, when significant associations are found with intermediate outcomes, as for the nine tested PQIs for T2D care, this is sufficient to support the use of these PQIs in daily practice.

Clinical action indicators

Another step is the development of more clinical action indicators. For CKD care such indicators do not yet exist, and for T2D care there are still possibilities for improvement. For example, it may be useful to track available data in order to detect a trend in the risk factor of interest (is it going up or down, or is it steady?), and determine the need for (intensification of) treatment depending on this trend.

This may account for the situation where a healthcare provider does not start with medication when a risk factor level is above target for the first time. Looking at trends might therefore be a better way of assessing the quality of prescribing. Also, clinical action indicators on potentially inappropriate prescribing for both CKD and T2D could be helpful to support initiatives for deprescribing.

Subsequently, using clinical action indicators will ask for some changes in data collection. Data to calculate quality indicators usually only include data from one year. To be able to systematically calculate clinical action indicators, data over multiple consecutive years should be available and linked at individual patient level. Only then the clinical action indicators can be implemented in daily practice.

Updating prescribing quality indicator sets

Quality indicators are derived from evidence-based clinical guidelines. It is important to keep the quality indicators updated and compliant with each new guideline. Although in our sets the most recent guidelines were used, some of the recommendations may be somewhat outdated. In the Netherlands, a new multidisciplinary guideline for CKD care will be issued in the near future. Some of our PQIs will need adaptation to become compliant with this new guideline. The same will hold for the PQIs for T2D care when an update of the guideline will be released. Ideally, each new guideline should be accompanied by a list of valid quality indicators. To take a step towards this ideal situation, the possibility to incorporate (an adapted version of) our set of PQIs for CKD care within primary care with the new guideline is explored together with the Dutch College of General Practitioners (Nederlands Huisartsen Genootschap).

Furthermore, during the development phase of the indicator sets, several PQIs have been discarded. The reasons were diverse but some were discarded because the experts felt it was not possible or necessary to calculate them at that time. This included, for instance, PQIs assessing medication adherence by patients. However, times may change and in the future some of these PQIs might become measurable or important. Also other types of processes of care, such as lifestyle recommendations in addition to medication treatment, may be incorporated in the indicator sets. Therefore, in the future the possibilities should be explored of including appropriate indicators on those fields in indicator sets for T2D care and CKD care.

Clinical decision support and research purposes

Some of the PQIs may be incorporated in clinical decision support systems. Clinical decision support systems aid the healthcare provider to make the right choice of treatment, for instance, depending on risk factor levels or preferred drug

choices.³⁶ Our PQIs focusing on recommended treatments could be translated to algorithms for clinical decision support systems.^{37,38} For example, they could make the healthcare provider aware of the preferred choices or possible missed opportunities to improve the quality of prescribing. Furthermore, the indicators focusing on potentially inappropriate prescribing may be incorporated as alerts in existing alert systems.

PQIs can also be used for research purposes to identify areas for improvement and/or factors associated with suboptimal prescribing, as we did for the current quality of CKD care in three outpatient clinics in the Netherlands. PQIs are also used in intervention studies to test whether, for example, giving audit and feedback results in improved prescribing behaviour of the healthcare providers. A Cochrane review showed that there are different ways of providing audit and feedback, and that some appear more effective than others.¹³ Therefore, different interventions using the PQIs can be tested. The findings can be used to develop a successful intervention to improve the quality of prescribing. Even looking further ahead, a successful intervention could possibly trigger the development and validation of other sets of PQIs to improve the quality of prescribing among other patient populations.

So, although we are not at the end of the path towards the optimal assessment of the quality of prescribing and improving treatment of patients with CKD and/or T2D, we did take several important steps. This thesis presents two comprehensive, validated and workable sets of PQIs that can be implemented in practice for assessing and improving the quality of prescribing in CKD and in T2D care.

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