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Development of a maturity matrix to assess organizational readiness of community pharmacies for implementation of guideline recommendations in diabetes care

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Abstract

Objectives: Pharmaceutical care for people with diabetes mellitus type 2 (DMT2) has been described in professional guidelines. To apply their recommendations, organizational changes are needed. We aimed to describe, for the first time, the development of a maturity matrix for community pharmacy teams (MM-CP) to assess organizational readiness in implementing the guideline recommendations on pharmaceutical DMT2 care.

Methods: MM-CP development was conducted in a systematic consensus process with pharmacists from existing working groups. In three meetings with preparatory assignments, mutually exclusive domains were chosen for the DMT2 guideline implementation. After determining the growth steps, the resulting matrix cells were filled with examples of the organizational implementation activities. To explore the generalizability of domains and growth steps, two other working groups for "medication surveillance" and "multidose drug dispensing" guidelines were consulted.

Key findings: A five-by-five matrix was developed using the domains "personalized care," "teamwork," "information systems and data exchange," "external collaboration," and "education and research" on the horizontal axis, and the growth steps "being aware and motivated," "being able to," "performing, evaluating and improving," and "innovating" on the vertical axis. The MM-CP cells were filled with examples to implement the core recommendations of the DMT2 guideline. The matrix is to be used by pharmacy teams as a formative instrument.

Conclusions: The MM-CP is ready for use by community pharmacy teams for self-assessing their organizational readiness. However, further research is required to evaluate its potential in stimulating targeted improvement during the implementation of the DMT2-guideline recommendations in community pharmacies.

Keywords: pharmaceutical care; diabetes; community pharmacy; maturity matrix; organisational readyness

Introduction

Pharmacists have an important role in the development of medicines and their use in individual patients [1]. Pharmaceutical care [2] has been specified in various professional guidelines Given that well-organized practices have been shown to deliver high quality of care [3], the International Family Practice Maturity Matrix (IFPMM) was developed in 2010 [4, 5]. The IFPMM intends to facilitate the achievement of high team performance levels for general practices, and it was validated in one African and eleven European countries [6]. This matrix had 49 cells in total within 8 relevant organizational domains covering diverse activities, such as "using information," "using patient data," or "working in a team" in subsequent growth steps [6]. The underlying assumption was that general practices develop along similar pathways that can be defined within different levels of general assessment areas [5]. Given that *summative* judgments were shown to discourage practices, leading to resistance or "gaming" by distorting self-assessment scores to achieve rewards, the IFPMM was developed as a *formative* tool [4–6]. Consequently, it should promote communication and learning within the whole team by providing simple measures on the position of individual organizations within the potential spread of organizational maturity [5, 6].

Presently, no comparable formative tools are available to support community pharmacy teams in the implementation of guideline recommendations. In the Netherlands, the Royal Dutch Pharmacists Association on the Advancement of Pharmacy (KNMP) has developed professional guidelines along with the diabetes mellitus type 2 (DMT2) guideline, which was the first disease-related guideline [7]. People with DMT2 are treated predominantly in primary care, requiring multiple interventions from healthcare professionals [8]. A recent review on the effects of community pharmacist-led interventions in providing care for people with DMT2

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suggested the potential of multi-component interventions to improving clinical patient outcomes [9].

Given that KNMP-guideline recommendations are based on the latest best evidence available in diabetes care [10], many recommendations require changes in the daily practice of community pharmacies, such as the routine use of laboratory measurements in medication surveillance. However, no tool has been developed to support community pharmacists in the implementation of guideline recommendations. Earlier assessments of quality indicators on the implementation of the desired care processes showed substantial practice variations and need for improvement [10]. Therefore, the present study aimed to describe for the first time the development of a maturity matrix for community pharmacy teams (MM-CP) to assess organizational readiness in implementing the recommendations on pharmaceutical DMT2 care.

Methods

Design

The MM-CP for the DMT2 population was developed in a systematic iterative consensus process with feedback, in which individual responses were synthesized and aggregated for a group evaluation [11]. The MM-CP was developed stepwise in three guided meetings. The first meeting focused on defining the domains of organizational readiness in implementing the DMT2 guideline (horizontal axis of MM-CP). In the second meeting, the growth steps were discussed (vertical axis of MM-CP), and, in the third meeting, practical examples were formulated for each cell of the MM-CP and suggestions for the usability of MM-CP in daily practice. The 1.5-h long meetings were conducted online (due to COVID-19 pandemic) during day time between April and August 2020.

Participants

MM-CP was developed by an existing working group who were invited by the Royal Dutch Pharmacists Association on the Advancement of Pharmacy (KNMP) to develop quality indicators based on the DMT2 guideline (purposive sampling). To further implement the DMT2 guideline recommendations, the working group was prepared to contribute to the design of the maturity matrix. All pharmacists (n = 11) from the working group contributed to the MM-CP development. Some were known as national experts in the field of pharmaceutical diabetes care (n = 3, three were women) or quality management (n = 2, one was a woman). The group was complemented with regular community pharmacists (n = 6, five were women). The participants' ages ranged from 35 to 60 years.

Reaching consensus

The MM-CP development was discussed during the meetings based on the individual preparatory assignments (Fig. 1). The meetings were facilitated by two female researchers with experience in guideline implementation, development of maturity matrices and quality indicators, and quality management in community pharmacies. This approach ensured that all working group members could contribute to the discussion and that reflective wrap-ups were provided regularly during the meeting. For each meeting, the facilitators synthesized and aggregated the individual assignments into a preliminary MM-CP enhanced with the conclusion from the previous meeting (reported in minutes by a secretary). This MM-CP was sent to the participants by mail at least a week prior to the meeting. The working group members reflected on the findings of the MM-CP evaluation during the meeting to determine any improvements necessary. All

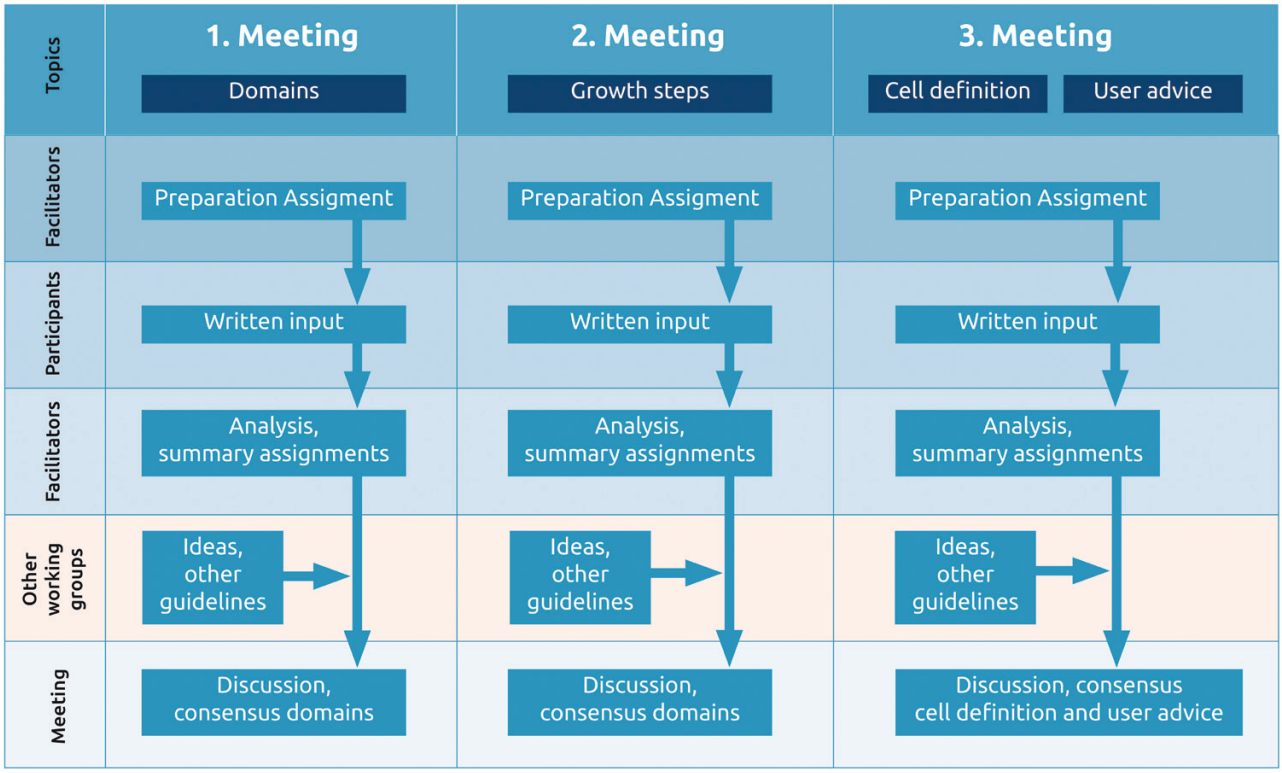

Figure 1. Development process of the maturity matrix for community pharmacy teams.

working group members were also given the opportunity to reflect on the minutes and add any missing information. The final MM-CP (group judgement) was drawn up by the facilitators and presented to the working group for approval by email.

Assignments

In the assignment for the first working group meeting, the facilitators presented the concept of a maturity matrix [4] and the IFPMM domains [6]. The participants were asked to think about meaningful domains for organizational readiness to implement the DMT2 guideline (horizontal axis of MM-CP). For the preparation of the second working group meeting, the facilitators asked the working group members to describe the growth steps for the MM-CP (vertical axis). In the assignment, the growth steps and the associated activities for two domains on which consensus had been reached were to be described. The preparatory assignment for the third meetings focused on describing exemplary activities in the cells of the MM-CP. The facilitators already synthesized and aggregated the examples that had been mentioned in the two previous meetings, and these were adapted and complimented by two working group members with a wide practical experience. Feedback on the description of the MM-CP cells was obtained from all working group members. Furthermore, the participants were invited to provide suggestions on the practical use of MM-CP. All assignments were sent via email to the facilitators 2 weeks before the meeting.

Validity check

As organizational readiness in community pharmacies related to DMT2 care addresses generic core processes in community pharmacies, the MM-CP axes should also apply to organizational preconditions in the implementation of other guidelines. Therefore, parallel to the DMT2 working group, the same facilitators also guided a comparable process in two other working groups for the KNMP guidelines "medication surveillance" (n = 7 pharmacists) and "multidose drug dispensing" (n = 9 pharmacists). The facilitators exchanged ideas on the MM-CP axes by which generalizability of the domains of organizational readiness and the growth steps can be validated.

Data analysis

The iterative data analysis (synthesizing and aggregating) was performed after each meeting by the facilitators based on the input from the assignments and discussion (minutes). One facilitator (JB) translated the suggestions collected into the (adjusted) preliminary MM-CP. This translation was reviewed by the other facilitator (MT) and discussed, if needed. In case of persistent disagreement among the facilitators, the issue was discussed in the next working group meeting. During each meeting, the analysis of the facilitators was discussed by the working group for any adjustments. In this way, the MM-CP developed by the DMT2 working group has been completed, including some advice for the practical use of MM-CP in community pharmacies.

Ethical approval

Informed consent was obtained from the working group members to participate in MM-CP development, and they agreed to publish the study results. Further ethical approval was waived due to Dutch legislation.

Results

Degree of participation

The participant attendance at the first, second and third working group meeting was high at 11, 8, and 8 members; the preparatory assignments had been provided by 6, 6, and 2 members.

MM-CP domain development

Table 1 shows the domains developed from the IFPMM for use in pharmaceutical care. Four IFPMM domains (i.e. "listening to patients," "using patient data," "managing staff," and "working as a team") were considered as relevant for the MM-CP, but they were restructured and rephrased. Three IFPMM domains, i.e. "using information to support patient care," "using information to support patient care," and "improving the practice," were regarded as too generic for use as a separate domain based on the following reasons: "using information to support patient care" was defined as following the guideline recommendations, which was the main purpose of the MM-CP; "improving the practice" was regarded as the principle to grow within each domain; and "operating procedures" with specific procedures for quality management in the Netherlands are part of the external summative quality assessment and therefore were not required to be part of this formative instrument. New ideas were added to the four already defined MM-CP domains. The additional proposals led to the fifth MM-CP domain "education and research." The working groups on "medication surveillance" and "multi-dose dispensing systems" came up with comparable considerations for their guidelines. They subsequently confirmed that the domains defined by the DMT2 working group were comprehensive and applicable for implementing their specific guideline recommendations.

MM-CP growth step development

For the second meeting, the working group members were asked to prepare assignments with activities showing growth in the MM-CP domains "personalized care" and "internal cooperation and teamwork." During the working group meeting, it was realized that all members had chosen steps comparable to those of the Deming Cycle [12]. During the discussions, a fifth growth step referring to innovations beyond the guideline recommendations was suggested to be added. This idea was confirmed in the other two working groups, and all working group members agreed that steps had to be taken subsequently (Table 2).

Activities to fill the MM-CP cells

The working group members intensively rearranged the specific activities in the MM-CP cells according to the domains and growth steps. This was done in the preparatory assignment, and continued during the meeting. Many new examples were provided as well, with most of them being related to the core recommendations of the DMT2 guideline (Table 3). This led to a number of examples in the personalized care domain. The activity of "evaluating" led to some confusion and was solved as following: "evaluating the medication of a patient" was defined as performing care and thus belong to step three, whereas "evaluating their own performance by the pharmacy team" belonged to step four. Deliberately examples given were

Table 1. Development from IFPMM to MM-CP domains.

IFPMM domains	Additional domains proposed	Output of discussion during the first working group meeting	Proposed MM-CP domain
1. Using information to support patient care		Was interpreted as following the guideline recommendations; however, this is part of the overall aim of the MM-CP and does not need a separate domain, however needs attention to pharmaceutical care for DMT2 patients.	n.a.
2. Using patient data		Was interpreted as using clinical data for DMT2 patient, e.g. laboratory assessments on glucose measurements and target values; data should be collected analyzed and exchanged electronically, timely; arrangements on data exchange with other healthcare professionals- external collaboration.	Information systems and data exchange
3. Managing staff		Was interpreted as team composition in number and qualification, team building, internal cooperation—not specific for DMT2 care but a general precondition	Internal cooperation
4. Working as a team		Specific needs to implement DMT2 care were discussed as knowledge on diabetes aids, drugs, start and chronic drug therapy; the general process of team cooperation is not DMT2 specific.	Internal organization and teamwork
5. Listening to patients		Was interpreted as personalized care with consulting, shared decision making, self-management support in DMT2; examples are individualized pharmaceutical care during fasting, communication to patients with low health literacy; is the core business of pharmaceutical care	Personalized care
6. Improving the practice		Activities in quality management, should be part of all pharmacy processes, quality assessment, and assurance.	n.a.
7. Operating procedures		Interpreted as quality management system with stakeholder analysis, risk assessment, analysis of complaints, and mistakes; should be underlying principle of all processes and as such be used in the growth steps	n.a.
	Interprofessional cooperation	Better term: multidisciplinary cooperation, essential in DMT2 care for agreements for choices in pharmacotherapy (regional formularies), exchange of information, sharing in diabetes-related patient information, and treatment.	External collaboration
	Diabetes management	Specific activities related to pharmaceutical care in diabetes	Personalized care
	Expertise in diabetes care	Knowledge of new drugs in DMT2, aids for DMT2 drug administration, deprescribing of medication—part of education	Education and research
	Innovation	Continuous activities to obtain actual information on literature, drug developments, best practices in pharmaceutical care and participation in pharmacy practice research; strategically cute to include as an incentive to innovate voluntarily to stimulate	Education and research
	Training and research	Keep own knowledge up to date, contribute to developing new evidence to address DMT2 knowledge	Education and research
	Transparency of pharmaceutical services	Make pharmaceutical DMT2 care visible to the patient; should be part of the pharmaceutical care services	Personalized care

DMT2, Diabetes Mellitus Type 2; IFPMM, International Family Maturity Matrix; MM-CP, Maturity Matrix for Community Pharmacies; n.a.. not applicable.

not exhaustive, but they meant to inspire the pharmacy teams to discuss examples related to their own practice (Table 2).

Principles to use for the MM-CP

The group's consensus was to use the MM-CP as a formative instrument to facilitate team discussions for the implementation of specific guideline recommendations. All working group members agreed that the first four domains and the first four growth steps were the core of the MM-CP for implementing the guideline recommendations. The fifth domain and step were beyond the guideline recommendations and offered additional growth opportunities for high performing teams. All working group members agreed that it is essential to involve the whole pharmacy team into the MM-CP assessment. Subsequently, the team might decide on the specific organizational domain and growth step needed. Based on this premise, specific (clusters of) guideline recommendations could be chosen (Table 3). Finally, the team should develop a specific action plan and decide on goals, actions, persons involved, and timelines. Depending on the recommendations, the chosen growth could be needed in more than one domain.

Discussion

Principal findings

To the best of our knowledge, this is the first maturity matrix developed to support community pharmacy teams when implementing their clinical guidelines. The MM-CP was developed as a five-by-five matrix with the domains "personalized care," "teamwork," "information systems and data exchange," "external collaboration," and "education and research" on the horizontal axis, and with the growth steps "being aware and motivated," "being able to," "performing,"

Table 2. Maturity Matrix for community pharmacy teams in diabetes type 2 care.

MM-CP in DMT2 care	Personalized care	Internal organization and team work	Information systems and data exchange	External collaboration	Education and research
The degree to which the team actively performs on:	Adaption of care to individual needs with and for the patient	Task delegation related to personal competence, training, cooperation and team meetings	Management of DMT2-related patient information, exchange end use in medication surveillance	Joined local/ regional actions with other healthcare providers involved in DMT2 care	Participation and performance by pharmacist
Step 1 **Being aware and motivated**	• Knowing examples of patients needing personalized care, e.g. elderly, users of insulin, pregnant women • Knowing in what patients with what additional actions to use SGLT-2 inhibitors • Knowing of cautious use of non-selective β-blockers by DMT2 patients	• Putting the DMT2 guideline on the agenda for the team meeting • Alerting team members on risk patients and risk in DMT2 • Being alert for competences needed in DMT2 care in individual performance reviews with team	• Aware of need to register laboratory assessments in DMT2 care • ware on what laboratory assessments are relevant in DMT2 care • Aware of need to label DMT2patients in need of additional care • Aware for registration of relevant patient characteristics needed to individualize DMT2 care to	• Being aware of related healthcare providers in DMT2 care (e.g. GP, practice nurse, pedicure, dietitian) • Being aware of different tasks of healthcare providers in DMT2 care	• Being aware of trainings to be supplied for students, pharmacists, other healthcare providers • Being aware of new developments in DMT2 care • Being aware of the possibilities to become a pharmacist specialist in DMT2 care
Step 2 **Being able to**	• Prepared to discuss medication use in a personalized way adapted to patient' s health literacy • Having material available on use of insulin pens • Steps of consultation conversations prepared to adjust to individual patients	• Prepared to provide blood glucose measurements with related advice • Prepared to explain DMT2 care provided by the pharmacy team • Teamcompetenties op orde: scholing, aanvullende vacature • Prepared to teach back approach in consultations	• Organized the exchange of laboratory assessments with other professionals • Having made agreements on patient characteristics for medication surveillance and monitoring in DMT2 patients	• Organizing task delegation: who performs what? Think of consultation hours, adherence management • Coming to agreements for (partial) responsibilities • Coming to agreements for self-management support of DMT2 patients	• Having followed trainings to supply training • Looking for possibilities to perform training or join pharmacy practice research
Step 3 **Performing**	• Supporting patient self-management • Providing personalized instructions on diabetes aids (pens) • Registering renal function in starters of metformin or Inhibitors of the RAAS • Carry out medication surveillance in corticosteroid courses longer than 10 days	• Task delegation to organize activities for DMT2 patients • Taking care of team trainings for DMT2 care • Practicing consultations in primary and continuation dispenses for oral and parenteral medication	• Registering structurally if a patient is dialyzed • Having structurally potassium levels available in first dispenses of RAAS • Working conform a protocol, if necessary, laboratory assessments are not available	• Follow up joined agreements • Improve cooperation by jointly performing medication reviews • Advice the prescriber on alternative blood glucose lowering drugs if the target values are not achieved • Provide combined consultations between GP and pharmacist	• Providing lectures in DMT2 care • Participating in research related to DMT2 care
Step 4 **Evaluating and improving**	• Evaluating patient satisfaction (Patient reported experience measures) and outcomes (patient reported outcome measures) in relation to care provided • Measuring how many patents had personalized consults	• Periodically evaluating crucial organizational issues and improvements • Evaluating cooperation periodically with the team • Integrating specific structures and processes for diabetes care in the quality manual	• Being timely and comprehensive in registration, exchange and use of patient data to adapt medication surveillance and monitoring in DMT2 patients	• Evaluate annually cooperation in medication review: what are the partners involved? Are changes needed? What about task delegation to practice nurses in GP practices? • Evaluate and improve interprofessional cooperation	• Having students evaluate the trainings provided • Getting feedback on training performance to become a DMT2 pharmacist specialist • Getting feedback on following education principles

Table 2. Continued

MM-CP in DMT2 care	Personalized care	Internal organization and team work	Information systems and data exchange	External collaboration	Education and research
Step 5 **Innovating**	• Annual diabetes consultation regarding patient needs as formulated by the diabetes patient organization • Discuss the own performance of personalized DMT2 care in consultations with peers • Being alert on deprescribing of preventive drugs in DMT2 patients	• Organize a diabetes consultation hour • Use additional stickers in case of heat or flu waves • Having a team member responsible for patient monitoring	• Develop self a clinical rule to signalize deprescribing in eligible patients • Monitoring adherence to oral DMT2 related medication in the automated pharmacy computer system	• Make prestation related agreements in the pharmacotherapy audit meetings with GPs	• Having obtained the diploma as pharmacist expert • Having set up a project on DMT2 patient's self-management capacities

DMT2, diabetes mellitus type 2; GP, general practitioner; MM-CP, maturity matrix for community pharmacies; RAAS, renin aldosterone angiotensin system inhibitors.

"evaluating and improving," and "innovating" on the vertical axis. For the MM-CP in DMT2, the 28 core recommendations of the KNMP guideline for DMT2 case [13] were used to formulate examples for the growth steps per domain to inspire pharmacy teams in addressing their own practice. The group's consensus was to use the MM-CP as a formative instrument to facilitate team discussions and awareness for the implementation of specific guideline recommendations.

Strengths and weaknesses

The present study has some limitations. First, it does not perform an evaluation in some community pharmacies. However, a pilot study on feasibility was already performed involving eight community pharmacy teams with pharmacists and technicians. The results suggested recognizability of the domains and growth steps; in all teams, the MM-CP was used as a stimulant for discussing actions for further development. Second, the pharmacist technicians did not participate in the development process. Given that they are meant to use the MM-CP in their practice, their feedback about the use of the MM-CP should be carefully examined in the following validation study. The meetings were held online due to the COVID- 19 pandemic. It is difficult to say whether and how the online meetings influenced the development of the maturity matrix, but we noted that the participation rate remained high throughout the three meetings. Despite its limitations, the present the study has some strengths. Strength of the study is that the working group members were pharmacists engaged in daily practice, and experienced in quality management and guideline development and implementation. Especially, the practical examples came mainly from those participants who worked as community pharmacists. Involving different groups of pharmacists meant that the participants' input was diverse and that the complexity of implementation could be adequately addressed in the discussions. Given that a recent review stressed the importance of stakeholder engagement in developing guidelines as well as its implementation [14], in future studies, stakeholders' views should be examined as well. Another strength of the study is the validation of the domains and growth steps by two other working groups for application of the implementation of different professional guidelines.

Limited number of domains to be assessed

The evaluations for implementing new forms of pharmaceutical care showed substantial efforts from the research teams needed to warrant healthcare providers' fidelity in performing new interventions [15, 16]. Accordingly, the lack of time and flexibility to participate were the main barriers for community pharmacists to contribute to pharmacy practice research [17]. Regarding the numbers of interacting components, groups or organizational levels targeted, outcomes, and the difficulty of behavior required, the implementation of new guideline recommendations in community pharmacies has to be acknowledged as a complex intervention [18]. Consequently, multiple and potentially conflicting aims in terms of costs, supporting and retaining workforce, management of regulatory demands, and wider societal objectives need to be managed simultaneously [19]. Presently, no tool is available for community pharmacists to assess their organizational readiness using meaningful parameters without getting lost in the overall complexity of adhering to guidelines recommendations. By providing a tool with a limited number of domains at five

Table 3. Core recommendations of the KNMP-guideline diabetes mellitus, type 2 clustered for MM-CP domains involved.

Monodisciplinary

1. **General (relevant MM-CP domains: Personalized care, Internal organization and Team work)**
- Support diabetes patients in self-management to monitor their health status and react accordingly to reach the best possible health related outcomes and quality of life.
- Adapt your pharmaceutical care to comorbidities and other individual patient characteristics such as language, intention to become pregnant, pregnancy or frailty.
- Be alert for potential suboptimal medication use and discuss the possibilities to improve medication use and adherence with patients.
- Support the diabetes patient during initial treatment according to the steps for first and second dispense consultations in T2DM.
- Support the diabetes patient during chronic treatment according to the steps of consecutive dispense consultations for T2DM; pay attention specifically to starting glucagon-like peptide-1 (GLP-1) agonists, insulin and glucose measurements
- Evaluate for blood glucose measurement aids patient's performance on glucose self-measurement together with the suitability and quality of the aid.

2. **Patient advise (relevant MM-CP domains: personalized care, internal organization and team work)**
- Explain to patients at treatment initiation what pharmaceutical care they can expect from you.
- Advise insulin users to always contact their GP when vomiting.
- Inform users of sulfonylurea derivates and insulin about situations that could cause hypoglycemia, such as physical activity and alcohol intake.

3. **Medication surveillance (relevant MM-CP domains: personalized care, internal organization and team work, information system and data exchange)**
- Advise against the use of glipalamides because of an increased risk of hypoglycemia compared to other blood glucose lowering therapies, especially in patients older than 70, and provide an alternative.
- Be alert when exchanging insulin with biosimilars or changing insulin concentrations. Check bioequivalence, support the use of new pen systems and check for appointments to evaluate glucose measurements
- Advise patients with diminished renal function (eGFR <60 ml/min) or in case of dehydration to stop the use of metformin, sodium-glucose transport protein-2 (SGLT-2) inhibitors, and diuretics, and to half the dose of Renin-Angiotensin-Aldosterone System (RAAS) inhibitors temporarily; as long as the dehydrated state persists. Advise patients to contact their general practitioner (GP) when this occurs.
- Advise users of SGLT-2 inhibitors to cease the use temporarily in case of nausea, vomiting, extreme thirst, or surgery, and to contact their GP.
- Document patients who receive dialysis, because it affects the reliability of HbA1c measurements, therefore influencing personal targets. Dialysis also influences hypoglycemic risk, medication dose, and choice of blood glucose monitor.
- Advise diabetes patients of 60 years or older to combine non-steroidal anti-inflammatory drug (NSAID) treatment with proton pump inhibitor comedication to decrease adverse reactions (e.g. gastrointestinal hemorrhage).
- Advise users of oral blood sugar lowering medication to be alert for hyperglycemia and/or infections when using high intensity corticosteroid courses for at least ten days and to check their blood glucose level in the afternoon.
- Advise insulin users receiving systemic corticosteroids to always contact the healthcare provider in charge of their insulin treatment and perform additional blood glucose level checks to prevent hyperglycemia.
- Advise against non-selective beta-blockers in T2DM due to the masking of adrenergic hypoglycemia symptoms, and a reduced recovery speed from the hypoglycemic state. Provide an alternative to the GP.

Multidisciplinary: needing external cooperation

1. **General (relevant MM-CP domains: Internal organization and team work, external collaboration)**
- Cooperate with local/regional healthcare providers to find agreement on the provision of pharmaceutical care for diabetes patients. Document the responsibilities and tasks with cooperating healthcare providers, defined according to the recommendations of the Dutch Diabetes Federation (NDF) for multidisciplinary primary care.
- Come to agreement on the exchange of clinical patient data with local/regional healthcare providers using the recommendations of the NDF. Cooperate in building an adequate information infrastructure to enable data exchange.

2. **Pharmacotherapy (relevant MM-CP domains: personalized care, internal organization and team work Information system and data exchange, external collaboration)**
- For the effectiveness of drug treatment use individual patient targets for laboratory measurements (glycated hemoglobin (HbA1c), cholesterol and lipid spectrum and blood pressure) in medication reviews. Be aware that these targets are defined in relation to patient's disease duration, age, frailty and comorbidities.
- In multidisciplinary consultations, advise for personalized alternatives if patients do not achieve their HbA1c target level. Take patient characteristics into account such as the degree of HbA1c reduction, pharmacodynamics, patient age, frailty, renal function, hypoglycemic risk, bodyweight, comedication, comorbidities, patient preferences, and their circumstances, safety in the short and long term. Always check reimbursement and financial consequences.
- Discuss close monitoring of renal function, sodium and potassium levels with the GP in case of combined ACE-inhibitor and Angiotensin-II antagonist use. Advise against the combination when the patient is diagnosed with diabetic nephropathy.
- Discuss a severe reduction in renal function (>8 ml/min yearly) with the GP in case metformin, SGLT-2 inhibitors, RAAS-inhibitors, or diuretics are in use. Advise a (temporary) stop or halving the dose.
- Evaluate periodically with the prescriber to start or stop cholesterol lowering therapy.
- Evaluate periodically with the prescriber to start or stop blood pressure lowering therapy.
- After 6 months of SGLT-2 or dipeptidyl Peptidase-4 (DPP-4) inhibitors or a GLP-1-agonists check with the prescriber for the intention of treatment continuation.

and MM=CP cells at 24 allows community pharmacy teams to critically appraise their process performance from a much broader perspective needed for sustainable implementation of innovation. The IFPMM with eight domains and 49 cells was useful in an academic setting but not for use in clinical practice. We assume that the MM-CP developed based on

the proven effectiveness of the IFPMM concept but with less complexity and details in application may be more useful in clinical practice. Other maturity matrices with a limited number of domains are known in healthcare [20, 21].

Improvement and innovation

Beside the required core domains and growth steps, the MM-CP offers with the domain "education and research" and the growth step "innovation" also opportunities for early adopters to develop further. The working group members considered it as a valuable tool that could allow innovative practices to be defined in next steps. Focusing on innovation as well is rather uncommon for quality tools [19]. However, to further advance pharmacy practice and improving clinical, behavioral, economical, and humanistic outcomes, continuous innovation is needed, which requires research and education [22].

Exchange of practical activities

In the developed MM-CP, activities are described for each cell. It is clear that these activities are examples. Additionally, these examples filled in the MM-CP cells by pharmacy teams could be collected and exchanged to develop ideas and further grow of the whole profession.

Challenges of the community practice team

The increasing number of people with DMT2 worldwide [23] requires the establishment of more primary care services for diabetes treatment and prevention. The scarcity in the number of general practitioners prompted organizations in the Netherlands to encourage multidisciplinary cooperation in primary care [24]. Community pharmacists were shown for their potential to support general practitioners with that challenge in patient counseling and medication reviews [9]. To efficiently participate in multidisciplinary care teams, pharmaceutical diabetes care according to the latest standards needs to be broadly implemented in community pharmacies. Apart from the internal organizational preconditions regarding the community pharmacy teams and their knowledge, external preconditions for multidisciplinary collaboration and information exchange are also needed. The MM-CP provides support to the community pharmacy teams in the assessment and improvement of their organizational readiness, thereby contributing to the societal challenge of preventing and treating DMT2 patients.

Conclusion

This MM-CP that we have developed simplified earlier concepts that were extensively tested and validated within general practices, and its adaption for the implementation of pharmaceutical care recommendations in community pharmacy teams was described here. The MM-CP is ready for use by community pharmacy teams to self-assess their organizational readiness. However, the MM-CP should be examined carefully and thoroughly by pharmacy teams in terms of usefulness in assessing their organizational readiness, in identifying specific actions to implement specific guideline recommendations, and in showing related growth at reassessments. Further research should evaluate its feasibility in daily practice, and its potential to stimulate targeted improvement in implementing DMT2 guideline recommendations in community pharmacies.

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Author contributions

M.T., J.B., and K.F. formulated the research questions, designed the study and wrote the article. M.T. and J.B. carried the study out and analyzed the data.

Conflict of interest statement: None declared

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Data availability

M.T. and J.B. had complete access to the study data, all in Dutch language. K.F. had access to the translated results in this article and was supplied with information on the Dutch minutes when requested by the other authors. Data are the minutes of working group meetings and personal assignments. This information cannot be shared for privacy reasons. However, data is available on request.

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