



# The CombiConsultation for patients with diabetes, COPD and cardiovascular diseases: Evaluation of interventions and personal health-related goals

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## ABSTRACT

**Background:** The CombiConsultation is a consultation with the community pharmacist for patients with diabetes, COPD and/or cardiovascular disease (CVD), aligned with the annual or quarterly consultation with the practice nurse (PN) or general practitioner (GP). The consultation is focused on the personal health-related goals of the patient.

**Objectives:** To assess the number and types of personal health-related goals, drug-related problems (DRPs) and interventions identified by pharmacists during a CombiConsultation and to investigate which patients can benefit most from such consultation.

**Method:** Twenty-one Dutch community pharmacies and associated GP practices were included in the CombiConsultation study. CombiConsultations were performed, involving patients with diabetes, COPD and/or (at risk of) CVD. The pharmacists set health-related goals together with the patients and identified DRPs. The number and types of personal health-related goals, DRPs and interventions were analysed. Associations between patient characteristics and the identification of at least one DRP were analysed by multivariate regression analysis.

**Results:** In 834 patients (49% men, mean age: 70 years), 939 DRPs were identified, mostly (potential) side effects (33%), undertreatment (18%) and overtreatment (14%). In 71% of the patients, one or more DRPs were found, with a median of one DRP per patient. Pharmacists proposed 935 recommendations, of which 72% were implemented. DRPs were found more often in patients using a higher number of drugs for chronic conditions. A total of 425 personal health-related goals were set, of which 53% were (partially) attained.

**Conclusion:** The CombiConsultation can be used as a compact health service contributing to safe and effective use of medication for patients with diabetes, COPD and/or (at risk of) CVD, also in patients under 65 or with less than 5 medications in use. The output of the CombiConsultation reflects its characteristics.

## 1. Introduction

Globally, chronic diseases and multimorbidity are increasing due to ageing of the population. Adequate management is a major challenge and increases healthcare demand in primary care. Patients with chronic conditions often use (multiple) drugs, and proper pharmacotherapeutic guidance is needed. Pharmacists can contribute to safe and effective drug therapy by providing clinical pharmacy services, such as a clinical medication review (CMR), for these patients.<sup>1–3</sup>

To improve pharmaceutical care for patients with chronic diseases, the focus of care should be shifted from traditional disease-specific outcomes to patient-centred outcomes.<sup>4</sup> Therefore, it is important to assess these patients' problems and concerns related to their medication and to use shared decision-making to set personal health-related goals.<sup>5</sup> A CMR can contribute to the improvement of pharmacotherapy and outcomes relevant to well-being.<sup>6</sup> Although a full CMR is time-consuming and only relevant for high-risk patients, some form of medication review is also needed for patients with chronic conditions,

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requiring medication, that do not meet the criteria of a CMR. In addition, most pharmacists do not have the time to offer a CMR to all patients with chronic conditions, and a shorter consultation is needed. As an alternative to the medication review, the CombiConsultation was developed – a new pharmaceutical care service for patients with chronic conditions.

The CombiConsultation is a consultation by the pharmacist, aligned with the periodical check-up with a practice nurse (PN)/general practitioner (GP), for patients with chronic conditions. During this short consultation, the pharmacist focusses on the patient's problems and concerns regarding their medication used for their specific chronic condition and sets personal health-related goals together with the patient (step 1: Medication check). The pharmacist's recommendations to ensure safe and effective medication use are implemented during the check-up with the PN/GP (step 2: Implementation) and are evaluated a few weeks later (step 3: Follow-up).<sup>7</sup>

By focussing on a specific condition and because most patients will use less medication compared to patients eligible for a regular CMR, the CombiConsultation takes less time than a CMR and remains manageable for the pharmacist. In the Netherlands, patients with diabetes mellitus (DM), chronic obstructive pulmonary disease (COPD) and/or (at risk of) cardiovascular disease (CVD) are usually monitored in a chronic disease management programme. The monitoring process is performed by a PN in the GP practice, and it typically consists of regular (three- to six-monthly) check-ups with the PN, and an annual joint consultation with the GP and PN. So far, pharmacists have no structural role in chronic disease management in primary care. However, the CombiConsultation integrates pharmacists into patients' chronic disease management programmes, thereby increasing pharmacists' involvement in the treatment of chronic conditions and providing the opportunity to counsel patients earlier in the process of chronic medication use. This study aims to assess the number and types of personal health-related goals, drug-related problems (DRPs) and interventions identified by pharmacists during a CombiConsultation and to investigate which patients can benefit most from such consultation.

## 2. Methods

### 2.1. Study design and setting

This was a prospective intervention study performed in 21 Dutch community pharmacies and associated GP practices. The intervention consisted of a CombiConsultation performed by a community pharmacist in collaboration with a PN/GP.<sup>7</sup> Most pharmacists had access to complete medical data (clinical indications and laboratory values) after obtaining patients' consent. Pharmacists were recruited based on an existing good collaboration with local GPs. The participating pharmacies were located in both rural and urban areas. All pharmacists were experienced in conducting CMRs and during this study they received a 1.5 day training in consultation skills and study procedures. During the study, pharmacists participated in peer consultations centred on their experiences in practice and conference calls to discuss case reports.

### 2.2. Intervention

The CombiConsultation was conducted by the community pharmacist and either the PN and/or GP. During the 15–20 min consultation, the community pharmacist focused on potential health-related complaints in relation to the chronic condition for which the patient had an appointment with the PN/GP. Personal health-related goals were set together with the patient. After the consultation, the pharmacist identified DRPs and discussed them with the PN/GP. Either the pharmacist or GP/PN implemented the actions. A few weeks after the initial medication consultation, the pharmacist or PN/GP had a follow-up consultation with the patient to evaluate the implementation of suggested actions and whether the personal health-related goals had been attained.

The timing of the evaluation strongly depended on the type of intervention.<sup>7</sup>

### 2.3. Patients

In the participating practices, patients were invited by their pharmacists to participate in this study between January 1st, 2018, and July 31st, 2019. The inclusion criteria were

- patients with DM, COPD and/or (at risk of) CVD
- enrollment in a primary care chronic disease management programme
- 18 years or older
- use of at least one medicine

Eligible patients were invited by postal mail and/or telephone by either the pharmacist or GP (depending on local agreements).

### 2.4. Data collection

The pharmacists used an online data collection system to register demographics, personal health-related goals, DRPs and recommendations. The following were recorded: the date of the consultation, a description (free text) of the personal health-related goal and to what extent the goal was attained at follow-up, a description (free text) of the DRP, DRP type (based on the Hepler and Strand's<sup>8</sup> classification system), names and Anatomical Therapeutic Chemical classification codes of the drugs involved, description (free text) of recommendations (e.g. recommendation to stop a drug) proposed by the pharmacist, types of recommendations (e.g. cessation of the drug), acceptance of recommendations by the GP/PN and implementation status of the recommendation at follow-up and the date of follow-up. In addition, dispensing records and clinical records (such as laboratory values and blood pressure) for a period of five years prior to and six months after the date of the CombiConsultation were collected from the GP and pharmacy information system.

### 2.5. Outcomes

#### 2.5.1. The outcome measures were

- the number and types of personal health-related goals and percentage of goals (partially) attained using a three-point scale (not attained, partially attained and attained) based on a 6-point (–3 to +2) goal attainment scaling (GAS).<sup>5,9,10</sup> 'Partially' is defined as improvement compared to the starting position, but the goal has not yet been attained 100%.
- number and types of DRPs.
- number and types of recommendations, as well as acceptance and implementation rates. A recommendation was considered accepted if the PN/GP (partially) agreed to the proposal. An intervention was considered implemented if the intervention was directly performed by the pharmacist during the CombiConsultation (e.g. start over-the-counter medication or change intake schedule) or was based on the registration of the pharmacist during follow-up, along with dispensing records and/or laboratory values.

### 2.6. Analysis

Two investigators (VM and AE) checked the completeness and consistency of documented DRPs, types of interventions and assessment of the personal health-related goals using the description in the free text box. Differences were resolved by consulting a third investigator (either MH or HFK). The types of personal health-related goals were classified by the researchers based on the free text in the registration system. Duplicates were excluded from analysis. Dispensing and clinical records

were used to complete missing records on follow-up (of implementation of recommendations) and used to calculate the average number of chronic drugs per patient. Chronic medication use was defined as three or more prescriptions per ATC5 code in the last year, of which at least one prescription in the last six months.

Descriptive statistics were used to describe patient characteristics and number and types of DRPs, recommendations and personal health-related goals. Frequencies and percentages were reported for categorical variables. Associations between patient characteristics and the identification of at least one DRP were analysed by multivariate regression analysis (generalized linear mixed model in SPSS version 25, binary logistic with a random intercept at pharmacy level,  $p < 0.05$  significant).

### 2.7. Ethics and confidentiality

This project was exempted from formal medical ethical approval by the Medical Ethical Committee of the University Medical Centre Utrecht (METC protocol number 17–873/C). The research protocol was approved by the Institutional Review Board of UPPER, Division of Pharmacoepidemiology and Clinical Pharmacology, Utrecht University (UPF1706). Participation was voluntary, and all participants signed informed consent. To protect the patients' privacy, all data were anonymised by the community pharmacists using unique numbers.

## 3. Results

### 3.1. Basic characteristics

Twenty-one pharmacies with associated general practices participated in the study. The median number of CombiConsultations per pharmacy was 29 (range: 2 to 106). Pharmacists of 11 pharmacies conducted CombiConsultations in the collaborating general practice, pharmacists of 5 pharmacies conducted these in their own pharmacy and the remaining 5 used both locations. Medical data (e.g. clinical indications and laboratory values) were directly accessible for pharmacists of 20 pharmacies. Eight hundred thirty-four patients received a CombiConsultation. Patient characteristics are shown in Table 1.

### 3.2. Personal health-related goals

In 834 CombiConsultations, 425 personal health-related goals were set by the patients and pharmacists. The most frequently set personal health-related goal, based on the patients' wishes, was 'reduce number of drugs', followed by 'improve/reach target laboratory values'. Two hundred and twenty-five personal health-related goals were (partially) attained (53%), involving 198 patients. One hundred twenty-seven personal health-related goals were not attained (30%) and in 73 cases the follow-up or outcome was unknown (17%) (see Table 2). Three hundred twenty-seven goals were linked to a DRP.

### 3.3. Drug-related problems

Nine hundred thirty-nine DRPs were identified by pharmacists in the 834 participating patients (median: 1, range: 0–6). In 71% of the consultations, at least one DRP was found. The number and types of DRPs are shown in Table 3. Of the 939 identified DRPs, 363 DRPs (39%) were related to a personal health-related goal.

The pharmacists made 935 recommendations – 819 to another healthcare provider and 116 to the patient (giving information/advice about, for example, lifestyle or [side] effects of medication). Seventy-nine percent of the 819 recommendations were taken over by the PN/GP. Seventy-two percent of all recommendations were implemented (Fig. 1 and Table 4), involving 476 patients. During follow-up, it was observed that 63 of the 647 accepted interventions had not been implemented. The reason for nonimplementation was the patient declined or the intervention was forgotten or postponed. Thirty-three of

**Table 1**  
Baseline characteristics of participants of the CombiConsultation study.

Characteristics	N = 834 <sup>a</sup>
<b>Sociodemographic</b>	
Age in years (SD)	69.5 (10.1)
Sex, female	423 (51%)
<b>Care programme</b>	
Cardiovascular risk management	447 (54%)
DM	334 (40%)
COPD	44 (5%)
<b>Drug related</b>	
Number of chronic drugs in use per patient, mean (SD)	5.9 (3.1)
Multidose drug dispensing system in use	88 (11%)
<b>Chronic drug use, no. (%)</b>	
Lipid-modifying agents	557 (72%)
Antithrombotic agents	395 (51%)
ACE inhibitors and angiotensin II receptor blockers	386 (50%)
Blood glucose-lowering drugs, excl. insulins	265 (34%)
Beta-blocking agents	330 (43%)
Drugs for peptic ulcer and GORD	320 (41%)
Selective calcium channel blockers	201 (26%)
Low-ceiling diuretics, thiazides	153 (20%)
Vitamin A and D, incl. combinations of the two	135 (17%)
Antidepressants	93 (12%)

PN: practice nurse; DM: diabetes mellitus; COPD: chronic obstructive pulmonary disease; GORD: gastro-oesophageal reflux disease.

<sup>a</sup> Multidose drug dispensing system: 16 missing; order of consultations: 18 missing; care programme: 9 missing; number and types of drugs in use: 59 missing.

**Table 2**  
Type and attainment of personal health-related goals.

Type of personal health-related goal	n	Goal (partially) attained	Goal not attained	Unknown
Reduce number of drugs	84	37 (44%)	35 (42%)	12 (14%)
Improve/reach target laboratory values	48	25 (52%)	12 (25%)	11 (23%)
Reduce muscle complaints	42	21 (50%)	13 (31%)	8 (17%)
Reduce dizziness	32	11 (34%)	12 (38%)	9 (28%)
Reduce problems with diarrhoea or constipation	22	15 (68%)	4 (18%)	3 (14%)
Improve medication compliance	21	17 (81%)	2 (10%)	2 (10%)
Reduce practical problems with administration or intake of medication	20	18 (90%)	1 (5%)	1 (5%)
Reduce itching	17	10 (59%)	4 (24%)	3 (18%)
Reduce fatigue	14	6 (43%)	5 (36%)	3 (21%)
Reduce pain	13	6 (46%)	4 (31%)	3 (23%)
Other	112	59 (53%)	35 (31%)	18 (16%)
<b>Total</b>	<b>425</b>	<b>225 (53%)</b>	<b>127 (30%)</b>	<b>73 (17%)</b>

the 677 implemented interventions (5%) were quickly (before follow-up) reversed after implementation because, for example, the desired effect was not achieved.

### 3.4. Patient characteristics associated with the presence of DRPs

DRPs were found more often in patients with a higher number of drugs used for chronic conditions. Adjusted odds ratios (aORs) were 3–5 (aOR 1.8, 95% CI [1.0–3.0]), 6–9 (aOR 2.5 95% CI [1.4–4.4]), >10 drugs (aOR 2.7, 95% CI [1.3–5.7]) (see Table 5). Other characteristics (age, gender, multidose drug dispensing system and disease) were not significantly associated with the presence of a DRP.

**Table 3**  
Identified drug-related problems.

Drug-related problem type (N = 939)	Identified, n (%)
(Potential) adverse effect	311 (33%)
Undertreatment	169 (18%)
Overtreatment	146 (14%)
Medication not effective	65 (7%)
Useability problems	62 (7%)
Noncompliance	61 (6%)
Information/advice needed	41 (4%)
Additional monitoring required	22 (2%)
Incorrect dose	15 (2%)
Interaction/contraindication	12 (1%)
Other	35 (4%)
<b>Total</b>	<b>939 (100%)</b>

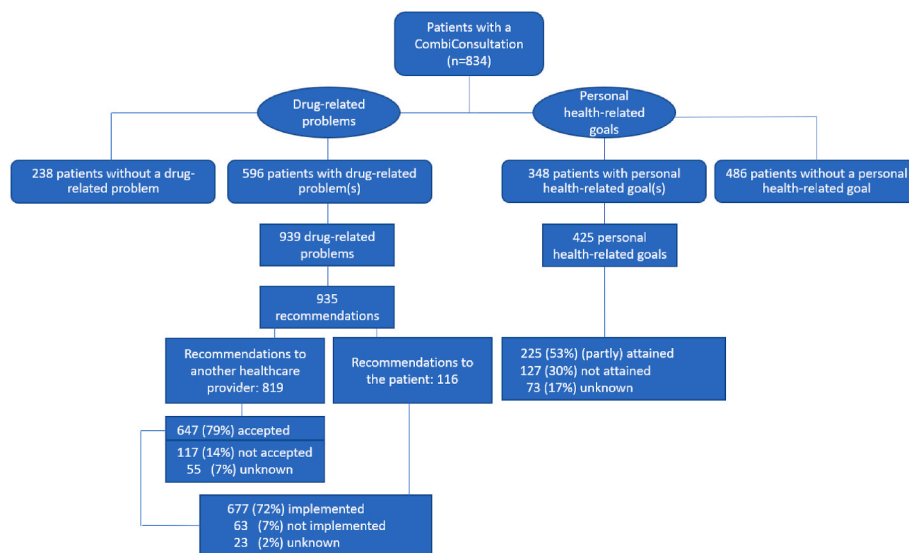
**4. Discussion**

This study demonstrated that the CombiConsultation can be used by pharmacists as a compact health service contributing to safe and effective use of medication for patients with DM, COPD and/or (at risk of) CVD using at least one medicine. First, regarding more than half of the patients for whom a personal health-related goal was set, the goal was (partially) attained. Second, pharmacists identified one or more DRPs in

most patients with a CombiConsultation, and their recommendations were generally well accepted and implemented.

In a CombiConsultation, a median of 1 DRP (mean: 1.1) was found. Reviews of CMR research showed that in CMR an average number of approximately 3–4 DRPs per patient is identified.<sup>2,11,12</sup> This is higher compared to the CombiConsultation, but a CMR usually involves older, more complex patients with a higher prior risk of DRP using more drugs. The time investment in the CombiConsultation (consultation of 15–20 min) is also much smaller compared to a CMR (consultation of 30–50 min).<sup>7,13,14</sup> Therefore, the overall efficiencies of the CombiConsultation and CMR in finding DRPs seem to be comparable. In addition, the CombiConsultation was deliberately designed as a short consultation with a focus on the most relevant problem(s) rather than an exhaustive identification of all potential DRPs.

The implementation rate of recommendations emerging from the CombiConsultation was high (72%) and within the range (17%–86%) of implementation rates that have been reported in studies on CMR.<sup>15</sup> The design of the CombiConsultation may have contributed to this high implementation rate. First, the consultation with the pharmacist and the check-up with the PN/GP were aligned, enabling faster communication between healthcare providers, especially when the consultation with the pharmacist was located in the general practice.<sup>16,17</sup> Second, participating pharmacists had access to medical data. Therefore, the



**Fig. 1.** Study flowchart.

**Table 4**  
Number, types and percentages of implemented recommendations.

Type of recommendation	n	Accepted (%)	Not accepted (%)	Accepted status unknown (%)	Implemented (%)	Not implemented (%)	Implementation unknown (%)
<b>Recommendation to another healthcare provider</b>							
Dosage/usage change	242	189 (78%)	31 (13%)	22 (9%)	164 (68%)	18 (7%)	7 (3%)
Cessation of drug	189	146 (77%)	36 (19%)	4 (4%)	124 (66%)	18 (10%)	4 (2%)
Replacement of drug	136	104 (76%)	22 (16%)	10 (7%)	92 (68%)	11 (8%)	1 (1%)
Addition of drug	119	92 (77%)	17 (14%)	10 (8%)	83 (70%)	7 (6%)	2 (2%)
Performance of (laboratory) monitoring	91	76 (84%)	9 (10%)	6 (7%)	60 (66%)	8 (9%)	8 (9%)
Other	28	27 (96%)	1 (4%)	0 (0%)	26 (93%)	1 (4%)	0 (0%)
Start of a multidose drug dispensing system	8	8 (100%)	0 (0%)	0 (0%)	8 (100%)	0 (0%)	0 (0%)
Dosage form change	6	5 (83%)	1 (2%)	0 (0%)	4 (67%)	0 (0%)	1 (17%)
<b>Total</b>	<b>819</b>	<b>647 (79%)</b>	<b>117 (14%)</b>	<b>55 (7%)</b>	<b>561 (68%)</b>	<b>63 (8%)</b>	<b>23 (3%)</b>
<b>Recommendation to the patient</b>							
Provision of information/advice	116	n/a	n/a	n/a	116 (100%)	0 (0%)	0 (0%)
<b>Total</b>	<b>935<sup>a</sup></b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>	<b>677 (72%)</b>	<b>63 (7%)</b>	<b>23 (2%)</b>

<sup>a</sup> For 4 of the 939 identified DRPs, no recommendation was made to the PN/GP.

**Table 5**  
Differences between patients with or without a DRP, multivariate analysis (n = 793)<sup>a</sup>.

Characteristic		No DRP (n = 216) n (%)	DRP (n = 577) n (%)	Crude OR (95% CI)	Adjusted <sup>b</sup> OR (95% CI)	p-value
Sex	Female	106 (49%)	293 (51%)	0.9 (0.6–1.2)	1.1 (0.8–1.6)	0.445
Age	≤65	59 (27%)	182 (32%)	1	1	
	66–75	100 (46%)	234 (41%)	0.8 (0.6–1.2)	0.8 (0.5–1.1)	0.173
	>75	58 (27%)	160 (28%)	1.0 (0.7–1.6)	0.9 (0.6–1.4)	0.599
Multidose drug dispensing system	Yes	520 (90%)	197 (91%)	1.1 (0.7–2.0)	0.9 (0.5–1.6)	0.648
	Care programme					
COPD	CVD	125 (58%)	305 (53%)	1	1	
	COPD	10 (5%)	30 (5%)	1.5 (0.7–3.5)	1.3 (0.6–3.1)	0.497
	DM	82 (38%)	241 (42%)	1.2 (0.8–1.7)	1.0 (0.7–1.5)	0.844
Number of chronic drugs in use per patient	1–2	36 (17%)	57 (10%)	1	1	
	3–5	82 (38%)	210 (36%)	1.7 (1.0–2.9)	1.8 (1.0–3.0)	0.035
	6–9	63 (29%)	199 (35%)	2.4 (1.4–4.1)	2.5 (1.4–4.4)	<b>0.001</b>
	≥10	20 (9%)	69 (12%)	2.7 (1.4–5.5)	2.7 (1.3–5.7)	<b>0.007</b>
	Unknown	16 (7%)	41 (7%)	1.4 (0.7–3.0)	1.4 (0.7–3.1)	0.361

DRP: drug-related problem; OR: odds ratio; CI: confidence interval; COPD: chronic obstructive pulmonary disease; DM: diabetes mellitus; CVD: cardiovascular disease.

<sup>a</sup> 41 patients excluded because of missing values.

<sup>b</sup> Adjusted for all other variables in the table.

pharmacists had more insight into already performed interventions, allowing them to make more targeted recommendations.<sup>18</sup> Third, the pharmacists were trained to focus on DRPs with a high relevance for the patient and therefore felt an urgency to solve them, which may have contributed to a high implementation rate.<sup>19–21</sup>

The pharmacist's focus on DRPs with a high relevance for the patient was realized by the design of the CombiConsultation, in which pharmacists and patients together set personal health-related goals. Frequently mentioned types of the set personal health-related goals were muscle complaints, dizziness and problems with diarrhoea or constipation, which are possible side effects of medication. This may explain why '(potential) side effect' was the most commonly identified DRP. More than half of the personal health-related goals (53%) was (partially) attained. This is comparable to a previous study in which after six months, 52% of the personal health-related goals were improved and 43% were attained.<sup>5</sup> Using personal health-related goals and evaluating them by GAS has been shown to be effective in improving outcomes that are important for patients' well-being and can lead to a better quality of life.<sup>6</sup> However, in our study, in more than half of the patients, no personal health-related goal was set. Pharmacists may not yet be used to setting goals with patients. Although the participating pharmacists were offered a basic training in consultation skills, more training may be needed. To work with personal health-related goals, pharmacists need to explore the concerns, wishes and health situation of patients and translate them together with patients to realistic goals and related actions by shared decision-making. When the patient is insufficiently involved in the process, this may negatively affect the relevance of the goal. In the decision-making process, the pharmacist should also ensure that the personal health-related goals are potentially achievable. Therefore, training and experience in this type of consultations are vital.

Given time constraints of the pharmacists and the high prevalence of patients in a primary care chronic disease management programme, it is challenging to invite all patients for a CombiConsultation. To identify patients who may benefit from a CombiConsultation, the predictive value of age, gender, the use of a multidose drug dispensing system, the type of care programme and the number of medicines for chronic conditions in use for finding a DRP were investigated. The number of medicines in use was the only factor that was significantly associated with a higher risk on DRPs. The number of medicines has also been found to be a predictor of DRPs in other studies on CMR<sup>22,23</sup> and it is often used as a selection criterium for CMRs. However, in our study, one or more DRPs were found in 61% of the patients with two or less medicines for chronic conditions in use, versus 78% of the patients with 10 or more of these medicines in use. Hence, the chance of finding a DRP was still substantial in the patients using relatively few drugs and not quite different from the patients using more drugs. Therefore, the number of medicines in use seems unsuitable as a single selection

criterion, and even for patients with few medicines, a CombiConsultation is useful in most cases. For common practice, two parallel solution directions are proposed. First, a shift in the pharmacist's task prioritization seems essential, paying more attention to clinical pharmacy services.<sup>24,25</sup> This gives the opportunity to also review the medication of patients who do not have polypharmacy of multimorbidity yet and for whom optimizing medication use can result in long-lasting prevention of potential problems. Although the need of this shift to clinical pharmacy services is widely recognized, the necessary changes in the healthcare system have not been realized yet.<sup>26</sup> Second, in addition to selection by number of chronic drugs in use, other criteria may be needed to tailor care to patient's needs and differentiate between CombiConsultations, CMR and other types of pharmaceutical care. Triage by healthcare providers can offer a solution, as their gut feeling may serve as a useful predictor.<sup>27</sup> For example, the pharmacy technician (at the counter) or the PN and GP can refer a patient to the pharmacist when they suspect a medication-related problem. In addition, self-triage by patients could be used<sup>28</sup>; patients could be informed about the CombiConsultation and encouraged to schedule an appointment with their pharmacist prior to their consultation with the PN or GP if the patients have questions or complaints about their medication. Optimizing the scope of the CombiConsultation requires further research into patients' experiences of the consultation, the perspective of healthcare providers and analyses of best practices.

#### 4.1. Strengths and limitations

Our study has several strengths and limitations. First, the high number of CombiConsultations performed and the number of participating centres make the results reliable. Second, there was access to several types and sources of patient data (pharmacist coding, free text fields, clinical records and dispensing records), ensuring the opportunity good data consistency. This also contributed to data completeness – which was good for a study involving over 800 patients with data registration in daily clinical practice, although completeness was higher for the registration of the initial steps than for the follow-up.

It needs to be addressed that the study was designed without a control group. A controlled study is needed to investigate the effect of the CombiConsultation on clinical outcomes. Furthermore, despite the fact that the practices were located across the Netherlands, they were probably not representative of the Dutch daily clinical practice in primary care. The participating pharmacists were mainly forerunners in the field of patient care involving an existing good collaboration between pharmacists and general practitioners. However, the participation of healthcare providers open to innovation suited our study type, exploring (the potential of) a new intervention. For wide implementation in primary care, further research is needed.

In this study, two different outcome measures were used, that have both advantages and disadvantages. Although DRPs are process outcome measures, it is important to include them in order to compare with the existing literature in this area. In this study, a start has been made with determining clinical outcome measures. Although this is a more patient-oriented outcome, there are still some limitation. For example, not all pharmacists are used to setting goals together with the patient, which is reflected by the data: 576 of the 939 DRPs were found that were not linked to a PHG. A PHG may have been set for some of these DRPs. However, some DRPs may also not be linked to a current PHG. A drug may not be necessary anymore, but not have side effects yet (e.g. when blood pressure is very well controlled but the patient does not notice dizziness) or a patient may be in need of treatment that would prevent disease in the long run, but is not an issue for the patient now. Additional training in consultation skills and shared decision making could help pharmacists to formulate more health related goals with the patient.

Also, the other way around occurred: 137 of the 425 PHG were not linked to a DRP. The data showed that pharmacists also set goals that did not always require an adjustment in the medication, indicating that the tasks of pharmacists are becoming broader (e.g. focus on lifestyle and prevention).

## 5. Conclusions

The CombiConsultation can be used by pharmacists as a compact health service contributing to safe and effective use of medication for patients with diabetes, COPD and/or (at risk of) CVD, also in patients under 65 or with less than 5 medications in use. With a relatively small time investment, pharmacists identified DRPs in a large proportion of patients and successfully implemented a high number of recommendations. Personal health-related goals were set together with the patient in almost half of the consultations, and more than half of the goals were (partially) attained. The output of the CombiConsultation reflects its characteristics, particularly alignment with the PN/GP periodical check-up, access to medical data and a focus on potential health-related complaints.

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## Authors statement

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## Declaration of competing interest

The authors declare that they have no competing interests.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.sapharm.2023.04.118>.

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