



# General Practitioners' Perspectives and Barriers to Deprescribing Inappropriate Medications in Primary Care

Montero-Balosa MC<sup>1</sup>, Caraballo-Camacho MO<sup>2</sup>, Cejudo-López A<sup>3</sup>, Solís De Dios JM<sup>4</sup>, Molina-López MT<sup>5</sup>

<sup>1</sup>PharmD, Primary Care Pharmacist, Aljarafe-Sevilla Norte Primary Care District, Andalusia Health Service, Seville, Spain

<sup>2</sup>Primary Care Pharmacist, Seville Primary Care District, Andalusia Health Service, Seville, Spain.

<sup>3</sup>Doctor of Nursing Practice (DNP), Nurse Practitioner, Seville Primary Care District, Andalusia Health Service, Seville, Spain

<sup>4</sup>MD, Family Doctor, Aljarafe-Sevilla Norte Primary Care District, Andalusia Health Service, Seville, Spain

<sup>5</sup>PharmD, Primary Care Pharmacist, Seville Primary Care District, Andalusia Health Service, Seville, Spain

## Correspondence

Montero-Balosa, MC

Servicio de Farmacia de Atención Primaria,  
Distrito de Atención Primaria Aljarafe. C/  
Avenida de Las Américas S/N, 41927-Mairena  
del Aljarafe, Sevilla, España

Tel: +34677778901

Fax: 34955515076

E-mail: mc.montero.sspa@juntadeandalucia.  
es

- Received Date: 28 Oct 2022
- Accepted Date: 05 Nov 2022
- Publication Date: 11 Nov 2022

## Keywords

medical errors, family doctors, deprescribing,  
inappropriate medication.

## Copyright

© 2023 Authors. This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International license.

## Abstract

**Introduction and objective:** Potentially inappropriate prescribing (PIP) is associated with adverse drug reactions and negative outcomes in older adults. The objective of the study was to assess the reasons expressed by General Practitioner's (GPs) to maintain their patients' PIP or the barriers to deprescribe.

**Material and Methods:** a mixed quantitative-qualitative study to explore the GPs' decisions and perspectives about reviewing PIP that were notified to GPs by an alert system (AS-PIP). The AS-PIP allowed GPs to send feedback information about the barriers for treatment modification, deprescribing or circumstances that were considered when taking the decision about not make any change in the medication schedule. Five types of PIP were selected. Patient reports with PIP were sent to GPs in two phases (April/2016 and July/2016). Theoretical Domains Framework was employed to classify GPs' opinions and barriers on maintaining PIP. GPs' feedback frequency, total and according to type of medication with PIP, and frequency distribution among main reasons recorded by GPs justifying their decision after reviewing PIP were calculated. Percentage reductions for each PIP were also evaluated.

**Results:** The main reasons given by GPs to explain why they continued to prescribe potentially inappropriate medication were: another physician originally issued the prescription; patients had good or bad control of their illness; and the treatment was not a potential risk to the patient. The most significant views were coded into 5 domains: (i) knowledge, (ii) social/professional role and identity, (iii) beliefs about capabilities, (iv) memory, attention and decision processes, and (v) social influences.

**Conclusions:** The study highlights the reasons given by GPs for maintaining PIP. The process of deprescribing seems to face with many challenges for GPs. The most relevant views are associated with no update in therapeutic knowledge, social pressure or influences, and lack of professional leadership.

## Introduction

Polypharmacy is a growing concern as a result of the use of different medications to manage multi-morbidity. The concept of treating an illness based on clinical practice guidelines seems to be one of the factors that has currently contributed to polypharmacy in patients [1]. This approach is common amongst older individuals and these patients become more vulnerable to medication related problems, including inappropriate prescribing [2].

Different studies have estimated that one in five drugs prescribed for older patients is inappropriate and that the risks outweigh potential clinical benefits [3]. Potentially Inappropriate Prescribing (PIP) is associated with drug side effects and hospital admissions, leading to increased morbidity, mortality and healthcare costs, as well as the intangible costs [4].

WHO launched "The third Global Patient Safety Challenge, Medication without Harm" in 2017 [5]. The challenge focused on improving medication safety by strengthening the systems for reducing medication errors and avoidable medication-related harms. It is essential to conduct a medication review, especially in the older population with polypharmacy, to avoid PIP [6].

Most published studies of potentially inappropriate medication are aimed at the analysis of appropriate medications using clinical practice guidelines, specific criteria (Beers or STOPP-START criteria [7-12]), investigating barriers and facilitators to improve prescribing behaviour [13-16] or even exploring patients' attitudes [17].

Doherty et al., [2] developed a systematic review to identify barriers and facilitators to deprescribing in primary care. The results showed cultural and organizational barriers

**Citation:** Montero-Balosa MC, Caraballo-Camacho MO, Cejudo-López A, Solís De Dios JM4, Molina-López MT. General Practitioners' Perspectives and Barriers to Deprescribing Inappropriate Medications in Primary Care. *Med Clin Sci.* 2023; 5(1):1-9.

such as a culture of diagnosing and prescribing; evidence-based guidance focused on single diseases; a lack of evidence-based guidance for the care of older people with multimorbidities; and a lack of shared communication, decision-making systems, tools, and resources. Interpersonal and individual-level were professional etiquette; fragmented care; prescribers' and patients' uncertainties; and gaps in tailored support.

Less is known about General Practitioner's (GPs) perspectives and opinions once they face an identified PIP in a concrete patient. It is supposed that in this scenario, the final objective is withdrawal or substitution of the drug causing the inappropriate treatment. GPs seem to be more reluctant to withdraw medication than to start a new treatment [18]. It would be useful to learn about the reasons under GPs' decision to maintain a PIP in a patient. This information would enable implementation of strategies designed to empower GPs and reduce potentially harmful consequences in general practice.

The Theoretical Domains Framework (TDF) is a tool designed to apply behaviour change theories. It was initially developed by a robust consensus by Michie et al. [19] and later updated by Cane et al. [20]. The domains have been widely used in health research to explain implementation problems and inform on implementation interventions [20].

The general objective of this research was to assess the reasons expressed by GPs to maintain their patients' inappropriate medications or the barriers to deprescribe. TDF was used to help classify GPs' perspectives of discontinuing medication involved in an identified PIP.

## Material and methods

### Design and study setting

We designed a mixed method, quantitative-qualitative, study to explore the GPs' decisions and perspectives about reviewing PIP that were identified and notified to GPs by an alert system (AS-PIP). The study was carried out using the GPs' feedback information registered in the AS-PIP dataset for every notified PIP. The study setting was a province in southern Spain, Andalusia, (Seville).

### Alert system to inform GPs about patients with PIP (AS-PIP)

The AS-PIP was a web-based system designed by the Andalusia Health Service (AHS) Pharmacy Department with the collaboration of a multidisciplinary group comprising GPs, hospital medical doctors, primary care pharmacists, hospital pharmacists and primary care nurses. The AS-PIP allowed GPs to send feedback information about the barriers for treatment modification, deprescribing or circumstances that were considered when taking the decision about not make any change in the medication plan.

### Potentially Inappropriate Prescribing (PIP)

Five types of PIP were selected based on the expert group criteria (Table 1).

### AS-PIP functionality

GPs could access to the information about patients with PIP through one of the following channels: a) a list loaded in a website (using a personal password); b) the patient electronic medical record that exhibits a visible icon when a PIP was present. Primary care center managers also provided GPs with printed reports as reminders. These reports contained a list of GP's patients with PIP and the reasons why the prescription was considered a PIP. All GPs were provided with a scientific evidence summary about PIP, through the same channels.

**Table 1.** Potentially inappropriate prescribing (PIP) selected in the study.

1st Phase: duplications of medications	
1.	Current prescription of two drugs from the following therapeutic subgroups: proton pump inhibitors (PPI) or angiotensin-converting enzyme inhibitors (ACEI);
2.	Concomitant prescription of two or more benzodiazepines (BZD) or Z-drugs (zolpidem or zopiclone) for longer than two months. Only prescriptions in primary care were considered and only patients without current prescriptions for other psychoactive drugs, such as antipsychotics, antidepressants and anti-dementia treatments;
3.	Concomitant prescription of two or more nonsteroidal anti-inflammatory drugs (NSAIDs) for longer than two months.
2nd Phase: inappropriate combinations of medications	
1.	Concomitant prescription of ACEI and angiotensin II receptor blockers (ARB): inappropriate drug combinations due to the increased risk of hyperkalaemia, hypertension and renal failure.
2.	Prescription of medications to reduce the risk of fractures and a long-acting BZD: an inappropriate drug/condition combination, since BZD (because of the potential risk of confusion or drowsiness leading to falls) may counteract the effect of the fracture-preventing drug.

The AS-PIP allowed GPs to record what action they took about the drug involved in the PIP: withdrawal of the drug, modification with alternative treatment, or maintenance of the inappropriate medication. In case they decided to maintain the treatment without any change, the GPs could explain on a patient-by-patient basis why they decided to proceed that way and expressed their views freely and informally, without the constraints of a structured questionnaire.

GPs were not compelled to respond to a notification of a PIP, and they were not required to give a reason if they decided not to provide information about the action taken if they received a PIP notification concerning their patients. Each GP could only see their PIP according to their patients. PIP was loaded into the notification system in two phases:

- a) Phase 1: duplications of medications (April 2016);
- b) Phase 2: inappropriate combinations of medications (July 2016).

### Data source

The AS-PIP database was used to obtain the anonymous information about PIP, actions taken by GPs and the reasons or barriers to maintain or deprescribe an inappropriate medication. All types of PIP and feedback information were included in the study.

### Data analysis

Data analysis was conducted in two phases:

### Quantitative assessment

Age (media and range) of the whole group of patients with PIP and for those with polypharmacy were calculated. GPs' feedback frequency, total and according to type of medication with PIP, and frequency distribution among main reasons recorded by GPs justifying their decision after reviewing PIP were calculated. Percentage reductions for each PIP were also evaluated.

**Table 2.** Principal reasons given by GPs after reviewing potentially inappropriate prescribing (PIP) in their patients. Number and frequency are shown according to type of medication with PIP and each subgroup of comments.

Justificación of the PIP	Nº PIP	Nº Comments	Frequency	% Subgroup
<b>Duplication of PPI<sup>a</sup></b>	<b>1,335</b>	<b>332</b>	<b>24.90%</b>	
Problem resolved just before notification of the PIP				43%
Initiated by physicians in other settings (hospital/specialist centres)				21%
Alternation of naproxen/esomeprazole and omeprazole				10%
Appropriate treatment				5%
Duplication of ACE inhibitors <sup>b</sup>	1,064	386	36.30%	
Captopril for hypertension crisis				48%
Initiated by physicians in other settings (hospital/specialist centres)				19%
Good control and/or tolerance with no adverse effects				8%
Appropriate treatment				6%
<b>ACE inhibitor<sup>b</sup> + ARB<sup>c</sup></b>	<b>1,480</b>	<b>1,147</b>	<b>77,5 %</b>	
Initiated by physicians in other settings (hospital/specialist centres/mental health centres)				25%
Withdrawal of ACE inhibitor				19%
Good or poor control				11%
Rescue treatment in hypertension crisis				10%
Withdrawal of ARB				4%
Patient appointment				3%
<b>Prescription ≥ 2 NSAIDs<sup>d</sup> (n=151)</b>	<b>415</b>	<b>151</b>	<b>36.40%</b>	
Initiated by physicians in other settings (hospital/specialist centres/mental health centres)				33%
Not for continued treatment (if severe pain, alternation)				31%
Rheumatic illness, fibromyalgia, palliatives				13%
Problem resolved just before notification of the PIP				13%
Each NSAID was for a different clinical situation				3%
<b>Prescription ≥ 2 BZD<sup>e</sup> (n=3,869)</b>	<b>6,575</b>	<b>3,869</b>	<b>58.80%</b>	
BZD for different symptoms (anxiety, depression, insomnia, etc)				42%
Initiated by physicians in other settings (hospital/specialist centres/mental health centres)				26%
Not for continued treatment (if crisis, contracture and so on)				8%
Withdrawn from trial at next consultation				7%
Unsuccessful withdrawal				6%
<b>BZD<sup>e</sup> + Fracture prevention drug (n=3,152)</b>	<b>3,913</b>	<b>3,152</b>	<b>80.60%</b>	
Appropriate treatment				44%
Withdrawal of BZD				15%
Initiated by physicians in other settings (hospital/specialist centres/mental health centres)				14%
Gradual withdrawal of BZD				6%
Change of BZD				4%
Withdrawal of fracture prevention drug				3%
<b>TOTAL</b>	<b>14,782</b>	<b>9,037</b>		

<sup>a</sup>PPI: proton pump inhibitor; <sup>b</sup>ACEI: angiotensin-converting enzyme inhibitor; <sup>c</sup>ARB: angiotensin II receptor blocker; <sup>d</sup>NSAID: nonsteroidal anti-inflammatory drug; <sup>e</sup>BZD: Benzodiazepine.

**Qualitative assessment**

Based on GPs’ feedback messages about their barriers to deprescribing inappropriate medication. GPs’ mean age, gender, and setting were analyzed for those GPs included in the qualitative assessment.

TDF was employed to identify and classify GPs’ opinions on PIP. This framework consists of 14 domains: ‘Knowledge’, ‘Skills’, ‘Social/Professional Role and Identity’, ‘Beliefs about Capabilities’, ‘Optimism’, ‘Beliefs about Consequences’, ‘Reinforcement’, ‘Intentions’, ‘Goals’, ‘Memory, Attention and Decision Processes’, ‘Environmental Context and Resources’, ‘Social Influences’, ‘Emotions’, and ‘Behavioural Regulation’. A total of 3 researchers (MCMB, MOCC, and MTML) worked independently to apply the TDF [20] to analyze and classify the GPs’ points of view and then resolved discrepancies in order to achieve a final consensus. This analysis was conducted by selecting GPs’ perspectives until no new ideas were emerging.

**Results**

**Quantitative assessment**

The mean age of patients prescribed with PIP was 67 years (range 1-104), 56.7% (n=7,486) were polymedicated patients (treatments involving 5 or more drugs). The average age of polymedicated patients was 76 years (range 65-104). Table 2

lists the main reasons recorded by GPs justifying their decisions after reviewing PIP of their patients.

According to the different types of PIP, the percentage reductions were: prescriptions  $\geq$  2 non-steroidal anti-inflammatory drugs (NSAIDs) (69.2%), duplications of PPIs or angiotensin-converting enzyme (ACE) inhibitors (65.9%), ACE inhibitors + angiotensin receptor blockers (ARB) (47.2%), prescriptions  $\geq$  2 benzodiazepines (BZDs) (44.3%) and BZD + fracture prevention drug (41.4%).

The PIP that showed the least reductions (BZD + fracture prevention drug, ACE inhibitor + ARB, prescription with  $\geq$  2 BZD) was associated with the most justifications offered by GPs (80.6%, 77.5% and 58.8%, respectively). After the GPs had reviewed their patients, the overall reduction in PIP was 48.0%.

A total number of 1,172 GPs received alert about PIP (from a total of 1,381 GPs in the province). 1,015 GPs (86.6%) made 9,037 comments corresponding to 13,200 patients and 14,782 potentially inappropriate medications.

**Qualitative analysis**

Feedbacks messages from 51 anonymous GPs were included in the study due to saturation of commentaries about alerted PIP that occurred in 61 patients. Of the 51 GPs, 24 were female, 32 worked in a rural primary health care centre, and the mean age was 59 years (range: 43-70).

**Table 3.** GPs’ perspectives about Potentially Inappropriate Prescribing in their patients, identified according to domain and illustrative quotes.

TDF domain	Potentially Inappropriate Prescribing	Illustrative quotes
<b>Knowledge</b> (clinical knowledge of condition, procedural knowledge, knowledge of task environment)	<b>Duplication of proton pump inhibitors:</b>	“Naproxen/esomeprazole for a while then take a break from omeprazole.” “Prescribed esomeprazole/48hrs and omeprazole/48hrs for maintenance of omeprazole and the patient takes esomeprazole only in periods when the symptoms are not managed with omeprazole.”
	<b>Duplication of ACEIa:</b>	“Enalapril-hydrochlorothiazide in the mornings and atorvastatin/aspirin/ramipril in the evenings.” “Rebel hypertension, which is best controlled with this treatment, each tablet to be taken every 12 hrs.” “Morning high blood pressure, the figures are corrected by taking captopril in the evenings.” “Required double dose of ACE* inhibitors, these days is better controlled clinically.” “They do not exceed the full dose of ACE inhibitors.” “Patient with hypertensive ischemic cardiopathy is being followed-up by cardiologist with ACE inhibitor+diuretics+calcium antagonists+alpha blockers; blood pressure was not controlled by 4 drugs, so ARBb was added in low dose. Cardiac insufficiency without renal insufficiency.”
	<b>Use of <math>\geq</math> 2 NSAIDs:</b>	“Celocoxib continued for rheumatology illness (followed-up by rheumatology). Naproxen is only for migraine attacks.” “Dexketoprofen is used because of its analgesic effect as it is a less potent NSAID.” “Take diclofenac if required, and if it doesn’t control pain, take celecoxib.” “Patient with pain crisis due to neurological disorder who requires injected rescue treatment for recovery if there is exacerbation of pain.” “Sometimes she takes one and on other days the other, according to the pain she experiences”. “This patient has arthritic psoriasis; therefore depending on the pain she takes one anti-inflammatory-analgesic or the other.” “Patient manages his pain treatment. He does not overdose, and he only changes the NSAID, associating analgesic properties from one to another, depending on the pain and time of the day.”



TDF domain	Potentially Inappropriate Prescribing	Illustrative quotes
	<b>Use of <math>\geq 2</math> benzodiazepines or Z-drugs:</b>	<p>“Take the 2 as adjuvants for the pain and the insomnia.”</p> <p>“The reason for using different benzodiazepines is to make the most of their pharmacokinetics.”</p> <p>“Zolpidem: hypnotic for getting enough sleep and diazepam to combat insomnia.”</p> <p>“Zolpidem: a hypnotic drug to control initial insomnia and diazepam for long-term insomnia.”</p> <p>“It was not discontinued because one is a hypnotic drug and the other is for anxiety, so there is no duplication.”</p>
<b>Social/Professional Role and Identity</b> (professional role, leadership, organisational commitment, professional boundaries, group identity)	<b>Duplication of proton pump inhibitors:</b>	<p>“In hospital, they indicate 20-40 mg doses, depending on the severity of the symptoms.”</p> <p>“I have prescribed omeprazole. He goes to a cardiologist who prescribes esomeprazole. So I keep this one as he [the cardiologist] has prescribed it and if he [the patient] prefers it to omeprazole, then he should go to the hospital.”</p>
	<b>Use of <math>\geq 2</math> benzodiazepines or Z-drugs:</b>	<p>“Treatment by private psychiatrist.”</p> <p>“Cardiopathy patient whose cardiologist treated him for reducing the anxiety.”</p>
	<b>Concomitant use of an ACE inhibitor and an ARB2 drug:</b>	<p>“Treatment by a specialist in Nephrology. I consulted them. Despite the fact that I cancelled treatment some time before, they insisted that concomitant use should continue.”</p> <p>“Treatment indicated and followed-up at the hospital by a cardiologist and nephrologist. Nephrologist advises continuing dual blockade of the renin-angiotensin system in this patient in order to control the albuminuria and so improve nephron protection”.</p> <p>“Hospital treatment, untouchable.”</p> <p>“Treatment directed by cardiology. Nor do I see it as advisable, when he comes to renew prescriptions, I will comment.”</p> <p>“The endocrinologist recently changed the drug and didn’t cancel the previous medication.”</p>
<b>Duplication of ACEI:</b>		<p>“Captopril was the medication for blood pressure, not prescribed by me, and ramipril was indicated by the cardiologist at the last check-up.”</p> <p>“I follow the cardiologist’s instructions.”</p>
<b>Beliefs about Capabilities</b> (self-confidence, perceived competence, self-efficacy, perceived behavioural control, beliefs, self-esteem, empowerment, professional confidence)	<b>Use of <math>\geq 2</math> benzodiazepines or Z-drugs:</b>	<p>“Chronic treatment. No consultation at the health centre for 1 year. I assume it is stable and under control.”</p> <p>“The maximum doses of benzodiazepine, added together, are not exceeded. It is not inappropriate.”</p> <p>“I continue the bromazepam treatment as a hypnotic since its use has not presented any problems for the patient during this time.”</p> <p>“Continued treatment based on my decision.”</p>
	<b>Concomitant use of a benzodiazepine and a fracture prevention drug:</b>	<p>“I have assumed the risk; nevertheless, it will be supervised.”</p>
<b>Memory, Attention and Decision Processes</b> (memory, attention control, decision making, cognitive overload / tiredness)	<b>Duplication of proton pump inhibitors:</b>	<p>“He has changed doctor. He is determined to take pantoprazole and I am in favour of omeprazole, but he comes for consultations on days when I am not there and manages to get pantoprazole prescribed. I am going to withdraw omeprazole and let his new GP make the decision to change to pantoprazole.”</p>
	<b>Use of <math>\geq 2</math> NSAID:</b>	<p>“Professional Nurse. Criteria explained in order to modify the prescription, the convenience of not taking both drugs simultaneously, after evaluating the recommendations of the orthopaedic specialist, we made the joint decision to prescribe it in this way, thus ensuring minimal use.”</p>
	<b>Use of <math>\geq 2</math> benzodiazepines or Z-drugs:</b>	<p>“Previously he was taking zolpidem 10 mg and due to the recommendation to change to 5 mg, I had to add lorazepam.”</p> <p>“Treatment justified: during the last annual check-up, bromazepam prescriptions were discontinued, but he continued to be symptomatic and I had to return to prescribing it.”</p> <p>“He does not take alprazolam any longer. I changed to lorazepam and maintained zolpidem in order to sleep.”</p> <p>“You cannot withdraw it suddenly, you need to take time.”</p> <p>“He needs 3 benzodiazepines; I will try to maintain two.”</p> <p>“I will try to replace one with an antidepressant.”</p>

TDF domain	Potentially Inappropriate Prescribing	Illustrative quotes
	<b>Concomitant use of an ACEI and ARB drug:</b>	<p>“Valsartan is discontinued due to interaction with ACEI and is replaced with amlodipine 10 if required.”</p> <p>“Error in prescription because it was only for April and then indicated a change, but it was left as an activated prescription with the rest of the medication. It has been withdrawn.”</p> <p>“Multi-pathological patient in regular follow-up by various specialists at the hospital level. At that time, I did not find any reasons for this pharmacological combination in the information available on the “i-health” platform. After reviewing the reports provided by the patient and the medications that were prescribed, I referred the patient to cardiology asking for confirmation the appropriateness of the combination, and then the treatment was continued.”</p>
	<b>Concomitant use of a benzodiazepine and a fracture prevention drug:</b>	<p>“Problem of risk of falls: diazepam 5 and alendronate 70. Alendronate is discontinued as a precaution. Need to evaluate the level of risk for osteoporosis by offering inclusion in the annual intravenous zoledronic acid programme.”</p> <p>“I am going to withdraw the diazepam so that the patient will come back for a consultation and we can evaluate the need for diazepam.”</p> <p>“I have found nothing that would justify the problem.”</p> <p>“I see no grounds for suspension.”</p> <p>“The patient was informed and accepted the risk.”</p> <p>“Anxiolytic diazepam is withdrawn because of the risk of falls and fractures. As an alternative treatment, we can add a first-generation antidepressant.”</p>
<b>Social Influences</b> (social pressure, social norms, group conformity, social comparisons, group norms, social support, intergroup conflict, power, group identity, alienation, modelling)	<b>Use of ≥ 2 NSAID:</b>	<p>“The patient is a doctor and prescribes his own treatment. The prescription is made by the patient”</p>
	<b>Use of ≥ 2 benzodiazepines or Z-drugs:</b>	<p>“Patient in whom we had already discontinued zolpidem the year before, and at their insistence I have had to prescribe it again.”</p> <p>“Withdrawal was out of the question, it is pointless to stop it, by whatever method.”</p> <p>“It is for his child, as he has no health card.”</p> <p>“The patient categorically refused. They became verbally aggressive, to such an extent that I continued the medication.”</p>
	<b>Concomitant use of a benzodiazepine and a fracture prevention drug:</b>	<p>“She has been taking it for more than 30 years.”</p> <p>“The patient refuses withdrawal of medication.”</p> <p>“She prefers the possibility of a fall through taking nightly diazepam so that she can rest, rather than the possibility of a fall through lack of rest.”</p> <p>“I withdrew clorazepate, even though I know the family is going to come back and ask for it again.”</p>

<sup>a</sup>ACEI: angiotensin-converting enzyme (ACE) inhibitors; <sup>b</sup>ARB: angiotensin II receptor blockers; <sup>c</sup>NSAID: nonsteroidal anti-inflammatory drugs.

A total of 5 TDF domains presented in detail here were prioritised to justify continuing to prescribe their patients' inappropriate medications based on the emphasis placed on them by GPs, the frequency of occurrence of the domain across all the commentaries, and the consensus agreement of the researchers. GPs' perspectives about PIP in their patients, identified according to the domain and illustrative quotes, are summarized in Table 3.

### Discussion

GPs' feedback about reasons to maintain a medication involved in a PIP show a frequency highly variable and depending on the PIP type. Nevertheless, these reasons, that might be considered barriers to deprescribing potentially harmful medications, could be included in three main categories:

- a) The prescription was originated by a hospital doctor,
- b) The decision of not modifying a treatment with good or bad control of the illness or targets, and
- c) The appreciation that the treatment seemed appropriate and the benefits of the drugs outweighed the potential risk for the specific patient with their comorbidities and concomitantly used drugs.

Only the first item has been reported by other authors [2,24-27], as this study focused on GPs' reasons to maintain a PIP and not exclusively on barriers to deprescribing.

One of the main features of this study was the use of 14 domains (TDF) to identify and classify the GPs' opinions without needing to conduct face-to-face interviews and allowing them to express their views informally and without restrictions. The most relevant commentaries identified in this study fell under the TDF domains of “knowledge”, “social/professional role and identity”, “memory, attention and decision process” and “social influences”, which is consistent with other studies [4,23-25,28,29].

Concerning “knowledge” and “Beliefs about capabilities”, some participants considered the risk of side effects associated with the use of certain medicines and made prescribing decisions with confidence:

*“I have assumed the risk; nevertheless, it will be supervised.”*  
 (Concomitant use of a benzodiazepine and a fracture prevention drug).

Other GPs assumed the knowledge of the patient about their treatments as one of the reasons to continue with PIP:

"Patient manages his pain treatment. He does not overdose, and he only changes the NSAID, associating analgesic properties from one to another, depending on the pain and time of the day." (Use of  $\geq 2$  NSAID)

In another context, some GPs justified the prescription of two ACEI by the use of captopril for hypertension crisis:

"Morning high blood pressure, the figures are corrected by taking captopril in the evenings." (Duplication of ACEI).

GPs' perspectives highlight the knowledge domain as one of the main barriers for discontinuing to prescribe potentially inappropriate medication. Doherty et al. [2] concluded uncertainties and lack of knowledge, awareness, guidance, and tools and resources for deprescribing made it easier for the GP to continue to prescribe and to maintain the "status quo".

Other studies have concluded that there should be a change of attitude in clinics towards treatments more focused on health results, as it would reduce the initiation of PIP in hospitals and primary care settings [15,20,23,28,29]. Some researchers have shown that there is a clear need for additional training in geriatrics and a lack of knowledge about maximum drug doses [24-26].

About "memory, attention and decision process", some GPs were especially concerned about the potential risk of inappropriate medications and decided the patient should be referred to another doctor:

"Multi-pathological patient in regular follow-up by various specialists at the hospital level. At that time, I did not find any reasons for this pharmacological combination in the information available on the "i-health" platform. After reviewing the reports provided by the patient and the medications that were prescribed, I referred the patient to cardiology asking for confirmation the appropriateness of the combination, and then the treatment was continued." (Concomitant use of an ACEI and ARB drug).

Uncertainty about whether there is a greater risk to the patient by withdrawing a drug versus the potential damage or adverse effect usually leads to the decision not to deprescribe, even when no clinical improvement is observed in the patient [3]. GPs' views seem to show that the main barrier in this domain is the fact that the challenge of *deprescribing* implies withdrawing treatment when there is no obvious adverse effect in the patient or when it could be mistaken for the symptoms of advanced ageing. Anderson et al. [3] observed that GPs saw *deprescribing* as a part of a process that requires time and resources, choosing to prioritize assessment or consultation over other clinical situations in the patient instead of withdrawing medication with potential risks.

Relating to "social/professional role and identity", GPs seemed to accept specialists' recommendations, even when they had doubts about whether medication prescribed by the specialist was optimal for the patient. Some GPs in our sample seemed unsure about adjusting medication out of a sense of loyalty to prescriptions issued by other doctors. Others described their disagreement with prescriptions from hospital settings:

"Treatment directed by cardiology. Nor do I see it as advisable, when he comes to renew prescriptions, I will comment." (Concomitant use of an ACE inhibitor and an ARB2 drug).

Some double prescriptions could be the result of multiple prescribers from different care settings, although the GP is the health care professional responsible for guaranteeing appropriate treatment in their patients. These results are consistent with those obtained in other studies highlighting a lack of communication

with other clinicians as one of the main interpersonal barriers to deprescribing inappropriate prescriptions [24-27].

On the subject of "social influences", GPs reported that some patients *demand treatment* and did not easily accept stop taking a medication that they have become used to during chronic periods and it led to double prescriptions (NSAIDs, ACE inhibitors or BZD, for example) [16]. These justifications are associated with patient empowerment, the implication of which is that good or bad management of treatment depends on the patient. This issue is particularly relevant to BZDs or Z-drugs, as some GPs commented:

"Patient in whom we had already discontinued zolpidem the year before, and at their insistence I have had to prescribe it again" or "Withdrawal is out of the question; it is pointless to stop it, by whatever method." (Use of  $\geq 2$  BZDs or Z-drugs).

Other authors have stated that the GP's perception of patient expectations, a lack of alternative treatments, and an appropriate doctor-patient relationship are decisive factors for initiation or maintenance of BZPs [27]. Another barrier that may contribute to the reluctance of GPs to deprescribe BZPs is the fact that they require gradual withdrawal, which means spending more time in shared decision making, and requires the collaboration of the patient. These results are in line with those obtained in an educational intervention by Clyne et al., [28] who observed that there was no impact on reduced duplication of BZPs in patients. Piccoliori et al. [29] found that the most frequent potentially inappropriate medications were benzodiazepines/hypnotics and concluded that GPs are faced with the challenge to address both medical recommendations and patients' expectations and to do so with a reasonable timeframe. Other researchers [30] have observed a tendency to prescribe benzodiazepines for more extended periods when patients live in more economically deprived neighbourhoods, which may be the reason for some patients in our study.

### Strengths and limitations

Our study has some potential limitations. Only those views expressed by GPs on a voluntary basis were considered valid for this study so that we do not know whether the reasons given are representative of GPs as a whole. The study explores five scenarios of clearly inappropriate prescribing. We assumed they did not illustrate the whole range of prescribing scenarios that are not necessarily good practice. Nevertheless, we considered that these particular clinical practices involved high risk for the patient and that a treatment review with written opinions might be a more appropriate method of deprescribing.

Although a written justification for not stopping a drug does not provide the same in-depth exploration of reasons as a qualitative study involving semi-structured interviews or discussion groups, our notification system allowed GPs to express themselves freely and honestly about their decisions concerning the maintenance of a PIP and it showed to be effective in reducing the PIP (48%).

The use of TDF enabled the mapping of GPs' views, and our results show that this approach was applied successfully, which represents a significant strength of our study. The inclusion of patients from different settings (rural, urban and social health centers) helped achieve high representation of a variety of clinical situations, as well as comments from a broad sample of primary care doctors, both male and female, in general practice, in different locations, and with a varied length of experience. As with any local study, however, our findings may not have



external validity because our cohort consisted of Spanish GPs and specific factors to the design of the Spanish healthcare system could explain their perspectives.

### Implications for policy, practice and research

The results of our study led us to consider the need to share and discuss the information about PIP with all primary care professionals. Also, it seems that this discussion could be an opportunity to collect topics of interest, uncertainty or knowledge gaps about drug utilization that could be overcome through evidence-based guidelines review. The challenge of maintaining PIP could be due to that patients do not often present with a recognisable clinical syndrome, and the clinical features of medicine-related harm are often attributed to unrelated geriatric syndromes or the effects of ageing. Deprescribing should become part of a wider movement towards more sustainable lifestyles, with a focus on reducing patient harm and the detrimental impact on healthcare resources. Polypharmacy should be considered a new emergent health problem that warrants proactive intervention like any other, such as a stroke or heart attack, particularly with advanced age. The GP is a specially qualified professional and ideally situated in the healthcare system to optimise and review the medical care of the patient. Further co-development and dissemination of safe deprescribing interventions, shared decision-making tools, and resources is required in primary care.

### Conclusions

The study highlights the attitudes and barriers expressed by GPs towards the maintenance of inappropriate medication. It seems that the process of deprescribing is laced with many challenges for GPs. The most relevant views are associated with no update in therapeutic knowledge, social pressure or influences, and lack of a joined-up communication and collaboration between different healthcare settings.

### Ethical approval

The study was exempt from any ethical approval since the GPs expressed their views voluntarily without identifying the patient with the PIP and according to the prescribing goals recommended by Andalusia Health Service, which encouraged the qualitative assessment.

### Authors' contributions

MCMB and MOCC contributed to the conception, design, analysis and interpretation. MCMB drafted the manuscript. MTML, MOCC, JMSD and ACL critically revised the manuscript, gave their final approval, and agreed to be responsible for all aspects of the study, ensuring integrity and accuracy.

### Funding

This study received no specific grant from any funding agency in the public, commercial, or not for profit sectors.

### Conflict of interests

There are no competing interests to declare.

### References

1. Scottish Government Polypharmacy Model of Care Group. Polypharmacy Guidance, Realistic Prescribing 3rd Edition, 2018. Scottish Government.
2. Doherty AJ, Boland P, Reed J, et al. Barriers and facilitators to deprescribing in primary care: a systematic review. *BJGP Open*. 2020;4(3):bjgpopen20X101096.
3. Anderson K, Foster M, Freeman C, Luetsch K, Scott I. Negotiating "Unmeasurable Harm and Benefit": Perspectives of General Practitioners and Consultant Pharmacists on Deprescribing in the Primary Care Setting. *Qual Health Res*. 2017;27(13):1936-1947.
4. Cullinan S, Fleming A, O'Mahony D, et al. Doctors' perspectives on the barriers to appropriate prescribing in older hospitalised patients: a qualitative study. *Br J Clin Pharmacol* 2014;79(5):860-9.
5. Medication without harm. WHO global patient safety challenge. Geneva (Switzerland): World Health Organization, 2017 [Accessed December, 2021]. Disponible en: <http://apps.who.int/iris/bitstream/10665/255263/1/WHO-HIS-SDS-2017.6-eng.pdf?ua=1&ua=1>.
6. Hansen CR, Byrne S, O'Mahony D, Kearney PM, Sahn LJ. Qualitative analysis of community pharmacists' opinions on their involvement in reducing potentially inappropriate prescribing. *Eur J Clinical Pharmacol* 2019; 75:265-274.
7. 2019 American Geriatrics Society Beers Criteria® Update Expert Panel. American Geriatrics Society 2019 Updated AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults. *J Am Geriatr Soc* 2019; 67:674-694.
8. Curtin D, Dukelow T, James K, O'Donnell D, O'Mahony D, Gallagher P. Deprescribing in multi-morbid older people with polypharmacy: agreement between STOPPFrail explicit criteria and gold standard deprescribing using 100 standardized clinical cases. *Eur J Clin Pharmacol*. 2019;75(3):427-432.
9. Knight EL, Avorn J. Quality indicators for appropriate medication use in vulnerable elders. *Ann Intern Med* 2001; 135:703-10.
10. Gavilán E, Villafaina A, Aránguez A, Sánchez G, Suliman S, Jiménez L. Índice de Adecuación de los Medicamentos: versión española modificada y guía del usuario, 2012. Available at: <http://www.somuca.es/ServletDocument?document=122>. Accessed September 28, 2020.
11. Gonzalez-Colaço M, Aldea-Perona AM, Boada-Fernández C, et al. Spanish list of potentially inappropriate drugs in the elderly (ES-PIA project). *Eur J Clinical Pharmacol*. 2019;75:1161-76.
12. O'Mahony D, O'Sullivan C, Byrne S, et al. STOPP/START criteria for potentially inappropriate prescribing in older people: version 2. *Age Ageing*. 2015;44(2):213-18.
13. Ryan C, Ross S, Davey P, et al. Junior doctors' perceptions of their self-efficacy in prescribing, their prescribing errors and the possible causes of errors. *Br J Clin Pharmacol*. 2013;76(6):980-7.
14. Ailabouni NJ, Nishtala PS, Mangin D, Tordoff JM. Challenges and Enablers of Deprescribing: A General Practitioner Perspective. *PLoS ONE*. 2016;11(4):e0151066.
15. McDonald J, McBain L, Dowell AC, Morris C. GPs' views and experiences of prescribing non-steroidal anti-inflammatory drugs: a qualitative study. *BJGP Open*. 2017;1(2):bjgpopen17X100869..
16. Green AR, Lee P, Reeve E, et al. Clinicians' Perspectives on Barriers and Enablers of Optimal Prescribing in Patients with Dementia and Coexisting Conditions. *J Am Board Fam Med*. 2019;32:383-91.
17. Eveleigh R, Speckens A, van Weel C, et al. Patients' attitudes to discontinuing not-indicated long-term antidepressant use: barriers and facilitators. *Ther Adv Psychopharmacol*. 2019;9:1-9.
18. Anthierens S, Tansens A, Petrovic M, Christiaens T. Qualitative insights into general practitioners views on polypharmacy. *BMC Family Practice*. 2010;15:11-65.



19. Michie S, Johnston M, Abraham C, et al. Making psychological theory useful for implementing evidence based practice: a consensus approach. *Qual Saf Health Care*. 2005;14(1):26–33.
20. Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implementation Science* 2012;7-37.
21. Riordan DO, Byrne S, Fleming A, Kearney PM, Galvin R, Sinnott C. GPs' perspectives on prescribing for older people in primary care: a qualitative study. *Br J Clin Pharmacol*. 2017;83(7):1521–31.
22. Anderson K, Stowasser D, Freeman C, Scott I. Prescriber barriers and enablers to minimising potentially inappropriate medications in adults: a systematic review and thematic synthesis. *BMJ Open*. 2014;4:e006544.
23. Modig S, Lenander C, Viberg N, Midlöv P. Safer drug use in primary care - a pilot intervention study to identify improvement needs and make agreements for change in five Swedish primary care units. *BMC Family Practice* 2016;17(1):140.
24. Valverde E, Mendizabal A, Mandaluniz D, Alcorta I, Fernández K, Alkiza ME. ¿Qué opinan los médicos de atención primaria sobre la deprescripción? *J Healthc Qual Res*. 2020;35(2):87-93.
25. Slight SP, Howard R, Ghaleb M, Barber N, Franklin BD, Avery AJ. The causes of prescribing errors in English general practices: a qualitative study. *Br J Gen Pract*. 2013;63(615):e713-20.
26. Ryan C, Ross S, Davey P, et al. Prevalence and causes of prescribing errors: the PRescribing Outcomes for Trainee Doctors Engaged in Clinical Training (PROTECT) study. *PLoS One*. 2014;9(1):e79802.
27. Sirdifield C, Anthierens S, Creupelandt H, Chipchase SY, Christiaens T, Siriwardena AN. General practitioners' experiences and perceptions of benzodiazepine prescribing: systematic review and meta-synthesis. *BMC Family Practice*. 2013;14:191.
28. Clyne B, Smith SM, Hughes CM, et al. (OPTI-SCRIPT study team). Effectiveness of a Multifaceted Intervention for Potentially Inappropriate Prescribing in Older Patients in Primary Care: A Cluster-Randomized Controlled Trial (OPTI-SCRIPT Study). *Ann Fam Med*. 2015;13(6):545-53.
29. Piccoliori G1, Mahlknecht A, Sandri M, et al. Epidemiology and associated factors of polypharmacy in older patients in primary care: a northern Italian cross-sectional study. *BMC Geriatrics*. 2021;21:197
30. Cartagena FJ, Porter L, McManus S, et al. Prescribing Patterns in Dependence Forming Medicines. Public Health Research Consortium. London: NatCen, 2017: [http://phrc.lshtm.ac.uk/papers/PHRC\\_014\\_Final\\_Report.pdf](http://phrc.lshtm.ac.uk/papers/PHRC_014_Final_Report.pdf).