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SYSTEMATIC REVIEW

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Understanding GPs' clinical reasoning processes involved in managing patients suffering from multimorbidity: A systematic review of qualitative and quantitative research

Sarah Cairo Notari[1,2] | Julia Sader[3] | Nathalie Caire Fon[4] | Johanna Maria Sommer[1] | Anne Catherine Pereira Miozzari[1] | Danilo Janjic[1] | Mathieu Nendaz[3,5] | Marie-Claude Audétat[1,3,4]

[1]Primary Care Unit, Faculty of Medicine, University of Geneva, Geneva, Switzerland

[2]Faculty of Psychology and Educational Sciences, University of Geneva, Geneva, Switzerland

[3]Unit of Development and Research in Medical Education, Faculty of Medicine, University of Geneva, Geneva, Switzerland

[4]Department of Family Medicine and Emergency Medicine, Faculty of Medicine, Université de Montréal, Montreal, QC, Canada

[5]Department of Internal Medicine, University Hospitals of Geneva, Geneva, Switzerland

Correspondence
Sarah Cairo Notari, Primary Care Unit, Centre Médical Universitaire, University of Geneva, Rue Michel-Servet 1, 1211 Genève 4, Switzerland.
Email: Sarah.Cairo@unige.ch

Abstract

Background: Most consultations in primary care involve patients suffering from multimorbidity. Nevertheless, few studies exist on the clinical reasoning processes of general practitioners (GPs) during the follow-up of these patients. The aim of this systematic review is to summarise published evidence on how GPs reason and make decisions when managing patients with multimorbidity in the long term.

Methods: A search of the relevant literature from Medline, Embase, PsycINFO, and ERIC databases was conducted in June 2019. The search terms were selected from five domains: primary care, clinical reasoning, chronic disease, multimorbidity, and issues of multimorbidity. Qualitative, quantitative, and mixed-methods studies published in English and French were included. Quality assessment was performed using the Mixed Methods Appraisal Tool.

Results: A total of 2 165 abstracts and 362 full-text articles were assessed. Thirty-two studies met the inclusion criteria. Results showcased that GPs' clinical reasoning during the long-term management of multimorbidity is about setting intermediate goals of care in an ongoing process that adapts to the patients' constant evolution and contributes to preserve their quality of life. In the absence of guidelines adapted to multimorbidity, there is no single correct plan, but competing priorities and unavoidable uncertainties. Thus, GPs have to consider and weigh multiple factors simultaneously. In the context of multimorbidity, GPs describe their reasoning as essentially intuitive and seem to perceive it as less accurate. These clinical reasoning processes are nevertheless more analytical as they might think and rooted in deep knowledge of the individual patient.

Conclusions: Although the challenges GPs are facing in the long-term follow-up of patients suffering from multimorbidity are increasingly known, the literature currently offers limited information about GPs' clinical reasoning processes at play. GPs tend to underestimate the complexity and richness of their clinical reasoning, which may negatively impact their practice and their teaching.

Review criteria

- Systematic searches were performed in Medline, Embase, PsycINFO, and ERIC from database inception through June 2019 for studies published in English and French.
- Quantitative, qualitative, and mixed-methods studies that reported data on general practitioners' clinical reasoning during the long-term follow-up of patients suffering from multimorbidity were included in the systematic review.
- An inductive (data-driven) content analysis was performed to synthesise the results.

Message for the clinic

- This systematic review showcased that whilst GPs perceive their clinical reasoning to be predominantly intuitive, this longitudinal reasoning is more complex, as there are many uncertainties and competing ongoing priorities to manage.
- It is of paramount importance for GPs to be more aware of their own clinical reasoning processes. A deeper understanding of these processes will draw full benefit towards the training of junior doctors.

1 | INTRODUCTION

Multimorbidity is defined as the "coexistence of two or more chronic conditions in the same individual"[1(p3)] and is considered one of the major challenges in primary care.[2,3] Patients suffering from multimorbidity represent more than 50% of the general practitioners' (GPs) practice.[4,5] Despite this high prevalence, GPs often report not being sufficiently trained to handle the care and complexity of these patients.[6]

Clinical reasoning is at the heart of medical practice,[7,8] therefore improving teaching in multimorbidity's field requires a deep understanding of the clinical reasoning processes used by GPs.[9] Clinical reasoning is usually defined as the thought and decision-making processes aiming to reach a problem resolution.[10] However, these processes are implicit and extremely fast, which makes them not readily accessible to clinicians and researchers.[10]

If "reaching a correct diagnosis" is often seen as the goal of clinical problem solving,[11] taking care of patients also requires that clinical reasoning continues beyond their diagnosis and then includes thoughts and choices regarding treatment, follow-up visits, and further testing.[12] This is even more the case when taking care of patients suffering from multimorbidity.

As clinical reasoning processes involved in chronic care remains poorly described in the literature, the purpose of this systematic review was to synthetise the available evidence in order to answer the following question: What is known about the way GPs reason and make decisions when managing patients suffering from multimorbidity in the long-term?

2 | METHODS

A comprehensive search of the relevant literature from Medline, Embase, PsycINFO, and ERIC was conducted from database inception through August 25, 2017, and updated on June 20, 2019. The search terms were selected from five domains: *primary care*, *clinical reasoning*, *chronic disease*, *multimorbidity*, and *issues of multimorbidity*. Both thesaurus descriptors and keywords (free text) were used. Complete search strategies are available in Appendices 1-4.

Studies published in English and French in peer-reviewed journals were included. Only original research papers with empirical quantitative and/or qualitative data were included. In addition, papers must meet the following inclusion criteria: (1) clinical reasoning reported; (2) context of multimorbidity; (3) long-term follow-up of patients (papers focusing exclusively on diagnosis process were excluded); (4) data collected from GPs.

Papers have been screened by the lead author, first by reading abstracts, and then reading full texts. Paired double checks were performed with the other research team members and discrepancies have been resolved by discussion and consensus amongst them. Finally, the reference list of the included articles has been manually scanned for additional relevant references.

The lead author has extracted data from all articles (ie, publication details, study design, GPs' characteristics, relevant results) and independent checks were performed by the second and the last author. Extracted data regarding the results were then entered into Atlas.ti software (version 8). An inductive (data-driven) content analysis was performed by three authors (SCN, JS, MCA) to synthesise the results (see Appendix 5).

The methodological quality of included papers has been assessed using the Mixed Methods Appraisal Tool (MMAT).[13] Discrepancies in the quality appraisal have been resolved by discussion and consensus between the first and the last authors.

3 | RESULTS

A total of 2 165 abstracts and 362 full-text articles were assessed. Thirty-two papers[14-45] (25 qualitative, 5 quantitative, and 2

mixed-methods) met the inclusion criteria (see Figure 1 for the flow diagram).

The thirty-two studies were published between 2009 and 2019. Most of them (n = 23) were carried out in Europe. All studies but two were published in English (see Table 1 for a summary of included studies). According to the MMAT, the methodological quality of all studies was considered satisfactory (see Appendix 6).

In current literature, GPs' clinical reasoning and its processes when managing multimorbidity are rarely explicitly mentioned. Terms such as clinical approach, management care, decision-making, and follow-up are mainly used when describing the specificities, challenges, and strategies used by GPs when it comes to multimorbidity.

According to our content analysis, we structured results in four sections, corresponding to four main themes: (1) the fundamental aim of multimorbidity's clinical approach; (2) specificities and challenges of multimorbidity's clinical approach; (3) clinical reasoning processes as perceived by GPs; (4) influencing factors of multimorbidity's clinical approach.

3.1 | The fundamental aim of multimorbidity's clinical approach

Most GPs agree that the fundamental aim of their clinical approach of multimorbidity is not necessarily to establish a precise diagnosis, but rather to best preserve and optimise the patient's quality of life.[16,24,29,31,41,42] Clinical reasoning in this context is about setting intermediate goals of care in an ongoing process that adapts to the patients' constant evolution and contributes to preserve their quality of life.

Incorporating quality of life considerations in therapeutic decision-making means to individualise treatment by adopting a patient-centred approach.[23] Patient's demands, preferences, and priorities in life serve as a reference point in clinical reasoning, which could facilitate decision-making.[25,29,31,36-38,42] This can be achieved only through a long-term therapeutic alliance and successful communication between the GP and the patient.[15,16,23,26,29,34,36,42,45]

Adopting a patient-centred approach raises the question of sharing the decision-making process with the patient, which was addressed

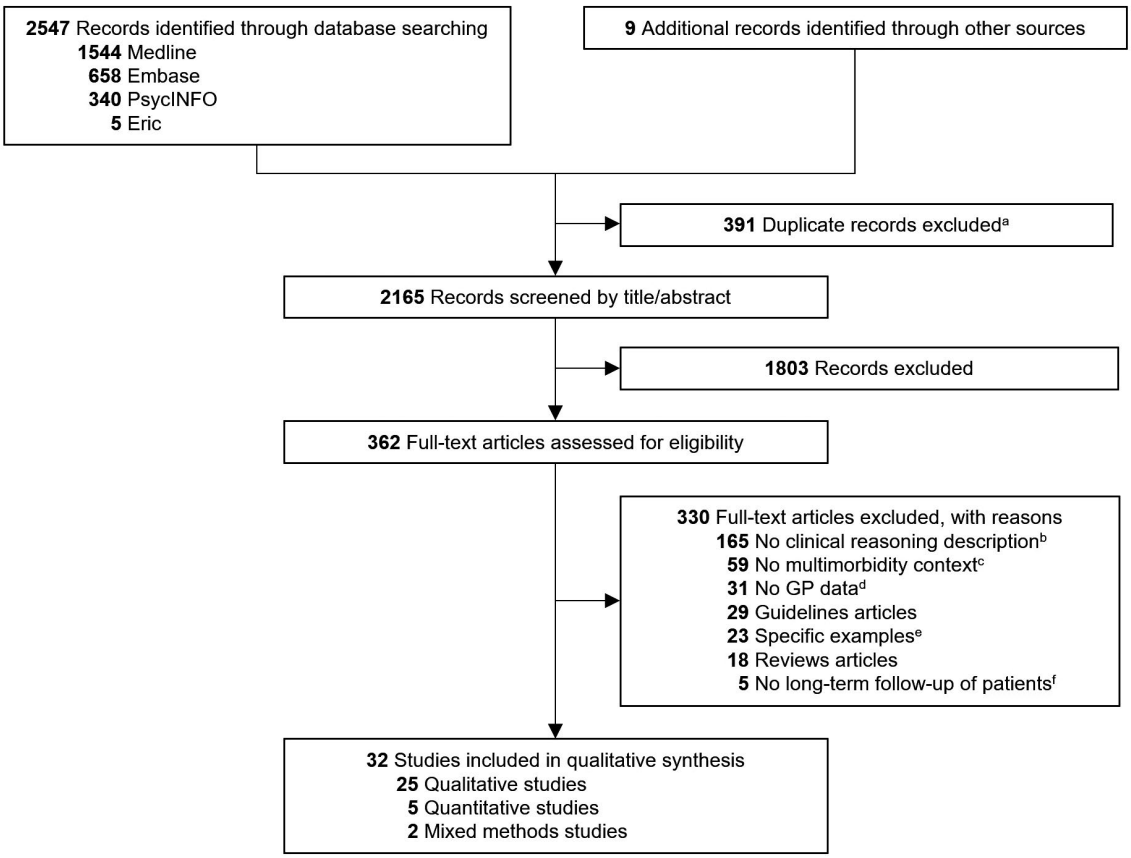

FIGURE 1 Flow diagram of study selection. Abbreviations: GP, General Practitioner. [a]EndNote software (Clarivate Analytics) was used to remove duplicates. [b]Articles considered as "off topic" because of the lack of data on GPs' clinical approach, management or follow-up of multimorbidity. No relevant (implicit or explicit) information on clinical reasoning could be extracted. [c]Articles on acute diseases, accidents, emergency care or preventive care. [d]Articles presenting data from other healthcare professionals (eg, nurses, pharmacists, physiotherapists) or from patients. Articles presenting data extracted from medical records were included if results allowed to illustrate the GPs' clinical reasoning processes. Articles presenting data from the mixed sample including GPs were excluded, unless specific data from GPs were presented. [e]Articles reporting unextractable or limited and ungeneralisable data, meaning that these papers presented results that dealt with the practical management of specific diseases and/or treatment and do not allow us access to the underlying clinical reasoning processes. [f]Articles exclusively focused on clinical reasoning in the diagnosis phase

TABLE 1 Characteristics of included studies

Source	Country	Aim of the study	Methods, Data collection (Analysis)	N	GPs' mean age, y	GPs' mean length of clinical experience, y
Ailabouni et al.[14] 2016	New Zealand	To explore GPs' opinions and awareness of deprescribing in older patients with multimorbidity	Qualitative, Semi-structured interviews (Content analysis)	9 GPs	Unknown	(range, 2-32)
Anderson et al.[15] 2017	Australia	To explore GPs' and consultant pharmacists' views about inappropriate polypharmacy, the reasoning they apply to deprescribing in primary care, and identify factors that support or inhibit this process	Qualitative Focus groups (Thematic analysis)	32 GPs	47 (range, 28-70)	18 (range, 1-50)
Anthierens et al.[16] 2010	Belgium	To describe GPs' views and beliefs on polypharmacy in order to identify the role of the GP in relation to improving prescribing behaviour	Qualitative Semi-structured interviews (Content analysis)	65 GPs	50	Unknown
Borgström Bolmsjö et al.[17] 2016	Australia and Sweden	(1) To compare and contrast behavioural factors influencing the deprescribing practices of GPs providing care for advanced care facilities (ACF) residents in two separate countries; (2) To review health policy and ACF systems in each setting for their potential impact on the prescribing of medications for older people in residential care; (3) To provide recommendations for future ACF deprescribing initiatives	Qualitative Review and critical synthesis of data from two qualitative studies	20 GPs	Unknown	Unknown
Carrier et al.[18] 2019	France	To understand GPs' attitudes about prescribing and/or deprescribing medicines for patients with multimorbidity and/or polypharmacy, and factors associated with their decisions	Quantitative Telephone-based survey: questionnaire (Multivariable logistic regression)	1183 GPs	30.6% (362) < 50 y, 32.6% (386) 50-58 y, 36.8% (435) > 58 y	Unknown
Clyne et al.[19] 2016	Republic of Ireland	To explore GPs' perspectives regarding prescribing and potentially inappropriate prescribing (PIP) in older primary care patients	Qualitative Semi-structured interviews (Thematic analysis)	17 GPs	Unknown	82% (14) > 10 y
Engberink et al.[20] 2013	France[a]	To document the determinants of the diagnosis and management of dementia by exploring GPs lived experience	Qualitative Semi-structured interviews (Phenomenological and pragmatic analysis)	12 GPs	Unknown	Unknown
Funk et al.[21] 2016	United States	To understand how GPs make decisions regarding severe obesity treatment and bariatric surgery referral	Qualitative Focus groups (Content analysis)	16 GPs	45.7 (SD, 11.3)	Unknown
Hermush et al.[22] 2009	Israel	To describe and evaluate the impact of a new model used in caring for older people in the community, based on geriatrician consultation, initiated by their GP and conducted by both in primary care clinics	Quantitative Survey: medical records (Chi-square test and one-way ANOVA or t-test)	542 Medical records	Unknown	Unknown
Herzog et al.[23] 2015	Germany	To explore how GPs view their professional mandates and capacities to provide comprehensive care for older people with complex health problems	Qualitative Semi-structured interviews (Open coding on a case basis and reiterated inter-case comparison)	10 GPs	Unknown	Unknown

(Continues)

TABLE 1 (Continued)

Source	Country	Aim of the study	Methods, Data collection (Analysis)	N	GPs' mean age, y	GPs' mean length of clinical experience, y
Jansen et al.[24] 2017	Australia	To explore GPs' decision making about primary cardiovascular disease prevention in older patients	Qualitative Semi-structured interviews (Thematic analysis)	25 GPs	20% (5) < 40 y, 4% (1) 40-49 y, 40% (10) 50-59 y, 36% (9) > 60 y	8% (2) < 10 y, 16% (4) 10-19 y, 28% (7) 20-29 y, 48% (12) > 30 y
Kenning et al.[25] 2013	United Kingdom	To explore how GPs and patients understand and experience multimorbidity and how these accounts differ, and how they affect attitudes and engagement with self-management	Qualitative Semi-structured interviews (Thematic analysis)	13 GPs	Unknown	20.23 (range, 8-36)
Kristensen et al.[26] 2017	Denmark	To explore GPs perceptions and assessment of self-care ability in patients with multiple chronic conditions who have difficulty following treatment	Qualitative In-depth semi-structured interviews (Systematic text condensation)	12 GPs	(range, 37-69)	(range, 1-41)
Laursen et al.[27] 2018	Denmark	To explore whether GPs experienced barriers towards medication reviews in patients with multimorbidity and polymedication, and how a clinical pharmacologist with a focus on pharmacotherapy can support the GPs in an outpatient clinic	Qualitative In-depth semi-structured interviews (Content analysis)	14 GPs	Unknown	15
Loeb et al.[28] 2012	United States	To examine GPs' perceptions of patient, GP and system factors that affect the care of complex patients with mental and medical illness	Qualitative In-depth semi-structured interviews (Inductive, participatory, team-based approach)	15 GPs	38 (range, 29-52)	7 (range, 0-24)
Luijks et al.[29] 2012	The Netherlands	To explore GPs' considerations and main objectives in the management of multimorbidity and to explore factors influencing it	Qualitative Focus groups with interview guide (Constant comparative analysis)	25 GPs	50 (range, 31-63)	20 (range, 2-36)
Luijks et al.[30] 2015	The Netherlands	(1) To explore and describe the value GPs attribute to medical guidelines when they are applied to patients with multimorbidity, and to describe which benefits GPs experience from guideline adherence in these patients. (2) To identify limitations from guidelines adherence, as perceived by GPs, and to describe their empirical solutions to manage these obstacles	Qualitative Focus groups with interview guide (Constant comparative analysis)	25 GPs	50 (range, 31-63)	20 (range, 2-36)
Magin et al.[31] 2015	Australia	To explore potentially inappropriate prescribing (PIM) by GPs by examining the context of PIMs use in community-dwelling older patients	Qualitative Semi-structured interviews (Thematic analysis)	22 GPs	Unknown	Unknown
Maio et al.[32] 2011	Italy	To assess GPs' knowledge of appropriate prescribing in older patients	Quantitative Cross-sectional survey: questionnaire (Descriptive statistical analysis; Chi-square tests)	155 GPs	54.2 (range, 40-69)	12% (17) ≤ 10 y, 28% (40) 11-20 y, 22% (32) 21-25 y, 38% (54) ≥ 26 y
Moen et al.[33] 2010	Sweden	To explore GPs' perspectives of treating older users of multiple medicines	Qualitative Focus groups with interview guide (Framework approach)	31 GPs	54 (range, 33-63)	22 (range, 5-38)

(Continues)

TABLE 1 (Continued)

Source	Country	Aim of the study	Methods, Data collection (Analysis)	N	GPs' mean age, y	GPs' mean length of clinical experience, y
Nixon et al.[34] 2016	Denmark	To answer three research questions: (1) When does medication discontinuation occur in general practice? (2) How is discontinuing medication handled in the GP's practice? (3) How do GPs make decisions about discontinuing medication?	Qualitative Semi-structured interviews; participant observations (Gioia method)	24 GPs	Unknown	15.6 (range, 0-26)
Press et al.[35] 2017	Israel	To identify factors associated with the implementation rate of geriatric recommendations in GPs	Quantitative Survey: medical records (Chi-square or Fisher exact tests; one-way ANOVA; Logistic regression)	488 Medical records, 98 GPs	Unknown	Unknown
Quinodoz et al.[36] 2016	Switzerland[a]	To increase knowledge on prioritisation's strategies used by GPs facing patients with multimorbidity	Qualitative Semi-structured interviews (Inductive thematic analysis)	5 GPs	Unknown	Unknown
Schuling et al.[37] 2012	The Netherlands	To explore how experienced GPs feel about deprescribing medication in older patients with multimorbidity and to what extent they involve patients in these decisions	Qualitative Focus groups (Central themes' extraction from selected and labelled fragments of transcripts)	29 GPs	54 (range, 39-65)	100% (29) ≥ 5 y
Sinnige et al.[38] 2016	The Netherlands	To gain insight into GPs' medication management strategies for patients with polypharmacy, and to explore the GPs' perspectives and needs on decision-making support to facilitate this medication management	Qualitative Focus groups (Framework approach)	12 GPs	56.3 (range, 46-63)	24.8 (range, 10-35)
Sinnott et al.[39] 2015	Republic of Ireland	To explore how GPs make decisions when prescribing for multimorbid patients, with a view to informing intervention design	Qualitative In-depth interviews using chart-stimulated recall (Grounded theory analysis)	20 GPs	Unknown	30% (6) < 10 y, 70% (14) > 10 y
Smith et al.[40] 2010	Republic of Ireland	To explore the views and attitudes of GPs and pharmacists managing patients with multimorbidity in primary care	Qualitative Focus groups (Framework approach)	13 GPs	Unknown	Unknown
Vermunt et al.[41] 2019	The Netherlands	To analyse GPs perceptions of the concept of goal setting within the context of shared decision-making with older patients with multimorbidity	Qualitative Semi-structured interviews (Thematic analysis)	15 GPs	51 (SD, 6.6)	(range, 3-34)
Vermunt et al.[42] 2018	The Netherlands	To develop conceptual descriptions of goal-oriented care by examining the perspectives of GPs and clinical geriatricians, and how the concept relates to collaborative communication and shared decision making with elderly patients with multimorbidity	Qualitative Semi-structured interviews (Thematic analysis)	15 GPs	51 (SD, 6.6)	(range, 3-34)
Voigt et al.[43] 2016	Germany	(1) To give an overview of rates of potentially inappropriate medications (PIM) prescription in older patients with multimorbidity and polymedication in the outpatient primary care setting; (2) To explain influencing factors on the prescription of PIM; (3) To examine knowledge and application of PRISCUS; (4) To understand GPs' reasons for prescription of PIM	Mixed Survey: medical records (Descriptive and multivariate statistical analysis) Interview with open questions (Content analysis)	1846 Medical records, 7 GPs	(range, 43-61)	(range, 7-22)

(Continues)

TABLE 1 (Continued)

Source	Country	Aim of the study	Methods, Data collection (Analysis)	N	GPs' mean age, y	GPs' mean length of clinical experience, y
Wolf et al.[44] 2017	Germany	(1) To examine if GPs distinguish between patients with chronic and acute episodic depression; (2) To describe the GPs' self-reported management of patients with chronic depression and to investigate the association between age, physical or mental comorbidity, and GPs' treatment decisions	Quantitative Cross-sectional survey: questionnaire (Descriptive and explorative analyses using paired comparison)	220 GPs	54.4 (SD, 8.5)	27.2 (SD, 9.3)
Wrede et al.[45] 2013	Germany	To examine to what extent GPs in consultations after a geriatric assessment set shared health priorities with older patients with multimorbidity and to what extent this was facilitated through patient-centred behaviour	Mixed Recordings of clinical consultations (Analysis scheme based on theoretical considerations; Categories occurrences; Chi-square test and Mann-Whitney U-test)	43 Consultations, 28 GPs	(range, 43-57)	(range, 7-20)

Abbreviation: GPs, General Practitioners.

[a]Article published in French. Extracted data have been translated by the second author who is a native French/English speaker.

by several studies.[21,24,29,33,36,37,39,41,42,45] Ideally, the GP should discuss with the patient and "jointly determine which goals [of care] are relevant and which steps should be taken in pursuing those goals [...]."[41(p5)] But, as shown by some studies, sharing decision-making is not as easily implemented.[24,42,45] Despite recognising the importance of incorporating patient's values in decision-making[42] and of implementing collaborative goals-setting,[41] translating this into practice may be very complex and not always possible or even beneficial.

Taking part in the decision-making process requires a high level of investment on the part of the patients, who are not always able to provide it because of their multiple medical conditions, and possible additional cognitive impairments, which make them unable to understand the various uncertainties and potential conflicts related to decision-making. Some GPs feel that these patients prefer not to be involved in decisions.[39]

Even when the patient can effectively participate in the decision-making process, GPs and patients do not always identify health problems in the same way[26,41] and the patient's preferences and priorities are not necessarily aligned with the GP's treatment plan.[42,45]

3.2 | Specificities and challenges of multimorbidity's clinical approach

Most studies highlighted the specificities of managing patients with multimorbidity as well as the potential difficulties encountered by GPs reasoning in that context. The following themes show how clinical reasoning might implicitly take place.

3.2.1 | Lack of guidelines

GPs agree that one of the main differences between managing a single disease vs multimorbidity is the lack of guidelines, an issue which was discussed by numerous articles.[15,16,18,19,25,26,29,30,32,33,36-40,43]

Generally, GPs treasure the availability of guidelines because they provide guidance to medical decision-making, but at the same time, they express a feeling of restraint.[30,33,37] They are aware that their strict application in the case of multimorbidity is not only difficult but even potentially counterproductive or dangerous for the patient.[18,25,26,29,30,33,40] Indeed, single disease guidelines can be conflicting, which impedes using several guidelines for a given patient.[25] In addition, older patients are rarely represented in existing guidelines.[15,30,33] This lack of guidelines adapted to multimorbidity leads GPs to a form of uncertainty[25] ; they generally feel ill-equipped and uncomfortable.[15,33,40]

3.2.2 | Collaboration and coordination between healthcare professionals

The management of patients suffering from multimorbidity involves the participation of several healthcare professionals. Close collaboration and coordination with them were recognised by GPs

as crucial to ensure optimal care and reduce risks (eg, polypharmacy).[17,22,23,27,38,43] But in daily practice this interprofessional collaboration is often poor or even absent.[15,19,27,37,38,40] It seems to be the same regarding clinical reasoning shared between healthcare professionals. For example, one paper highlighted that consulting a specialist or a pharmacist was rarely considered, as GPs wanted to optimise the patient's condition themselves first. It is only if the patient's condition did not improve, that they would be likely to deliberate with a specialist.[38]

From the perspective of GPs, the specialists essentially focus on the disease and rarely adopt a patient-centred approach.[16,27,39,43] In contrast, GPs perceive their approach as more holistic,[16,23,29] considering "all aspects of the patient."[27(p3)] They see themselves as being at the heart of the problem[20] and consequently in a privileged position to take on the role of coordinators of care.[16,29,36,40] However, the potential lack of communication with specialists makes this role challenging. This leads to poor coordination which might have negative consequences on the quality of care and patients' outcomes.[32,33]

3.2.3 | Polypharmacy and deprescribing

Many articles highlight issues relating to the management of polypharmacy and more specifically to deprescribing.[14-19,31,33,34,37-40]

Following multiple guidelines and the limited collaboration and coordination between healthcare professionals can potentially lead to polypharmacy, with harmful effects on patients.[16,25,27,29,33,40] Nevertheless, clinical reasoning with the perspective of discontinuing medication and consequently the practice of deprescribing are rarely implemented.[18,34]

Several explanations are reported in the literature. The routine of prescribing is so anchored in medical practice that a concerted effort is needed to even consider the possibility of discontinuing the medication.[34] Furthermore, it seems difficult for the GPs to identify the appropriate time to discuss discontinuation with their patients.[34] In this regard, one study showed that most GPs consider that patients might perceive stopping a long-prescribed treatment as an abandonment of their care[18,37] and that their patients expected medication prescriptions from them.[18] Another explanation lies in the fact that some GPs, when in doubt, prefer to adopt a "conservative approach"[31(p137)] and choose the "safer option"[34(p6)] which is to continue the prescribing and thus maintain the status quo.[15,19,39] Finally, GPs sometimes hesitate to change or stop a medication when it was prescribed by a medical specialist.[16,31,38,40] Contrary to what one might think in the context of collaborative reasoning, GPs seem to perceive the influence of other prescribers' opinions as a significant barrier to deprescribing.[14,17,19,33,37,38,40]

Despite these barriers, some GPs seem to deprescribe in a systematic way,[34] which seems to rely on specific reasoning strategies. These GPs create deliberately what the authors called "situations of dissonance"[34 (p4)] especially by scheduling regular check-ups and actively eliciting patient's experience with taking medication.[34,38] This reveals discontinuation cues, drawing the GP's attention to the possibility of discontinuing medication, which in turn increased the likelihood of enacting deprescribing.

3.3 | Clinical reasoning processes as perceived by GPs

3.3.1 | An "intuitive" reasoning

In the context of great uncertainty which characterises multimorbidity management, most GPs describe their reasoning as essentially intuitive (intuitive outlook[20]; "internal logic or intuitive knowledge"[15(p1940)]) and relied on "guesswork,"[40(pe290)] "hunches and best guesses,"[39(pe187)] "gut feeling,"[15(p1940)] and "common sense".[30 (p4)]

Generally, GPs seem to perceive this intuitive reasoning as less accurate and thus not acceptable.[15,30,39] Nevertheless, it is clear from their descriptions that their reasoning goes beyond mere intuition. It is, indeed, enriched by their medical knowledge and clinical experience,[15,36,38,39] and rooted in a deep understanding of the individual patient achieved through ongoing doctor-patient relationship.[26,39]

Amongst the reasoning processes identified in the literature, emphasis was placed on searching for balance and prioritisation.

3.3.2 | Searching for balance

The main reason why GPs think they only use intuition and common sense is the absence of appropriate guidelines. Given this, there seems to be a process of finding the right balance between what the guidelines recommend to do and what the GP thinks is the best clinical approach for a given patient.[30,39] Searching for balance is a complex process that requires GPs to consider and weigh multiple factors simultaneously. Often this process is summed up as weighing up the risks and benefits of adhering to a certain guideline, prescribing (or deprescribing) a certain medication or lifestyle change, etc.[15,18,24,31,33]

The patient-centred approach plays a fundamental role in this weighing process, allowing the GP to integrate the patient's requests, his/her perceived burden of treatment, and the potential benefit the GP aims to reach.[29,36] In this regard, an interesting concept has emerged from one article: "satisficing".[39] Satisficing means "settling for chronic disease management that was satisfactory and sufficient, given the particular circumstances of that patient."[39(pe186)] Searching for a balance between optimal disease management and patient-centred care implies for the GPs to accept lower levels of disease control than recommended by the guidelines.[38,39]

3.3.3 | Prioritisation

Another reasoning process essential to the management of multimorbidity is prioritisation.[15,20,21,29,36,43,45] Prioritisation is described as a way to decide amongst the best choice or best guess the GP can make

for a given patient.[36] This may involve choosing between treating one comorbidity or another, choosing between different treatment or test, etc. This process of decision-making should prioritise the patient's comfort and quality of life, even at the expense of suboptimal treatment.[29,43] Nevertheless, the way in which these decisions are made was not precisely described and thus remains unclear.

3.4 | Influencing factors of multimorbidity's clinical approach

Several studies examine factors (ie, healthcare system, patient, and GP's characteristics) which may influence GPs' clinical approach to multimorbidity.[15,17-19,23-29,32,33,35,37-40,43,44]

3.4.1 | Healthcare system's characteristics

In a few articles, GPs describe the healthcare system as a barrier ("cumbersome system"[28(p950)]) to optimal multimorbidity clinical approach. In that case, clinical context is characterised by the fragmentation of care,[19,28,29] lack of time and resources,[23,28,29,33,38,40,43] and a resulting increased workload,[40] which could negatively impact the GPs' clinical reasoning and impedes GPs to care for patients adequately.

3.4.2 | Patient's characteristics

Three quantitative studies have examined the influence of several patient's characteristics on the GPs' clinical approach of multimorbidity. The first study[35] found that a low patient's functional state and a high burden of chronic comorbidity were associated with a low rate of implementation of recommendations. The second study[18] highlighted that the patient's understanding of the risk of taking a medication, his/her age, and medical history were amongst the most important factors to consider in deciding whether or not to prescribe or continue a medication. The third study[44] showed that the kind of comorbidity affecting the patient (severe physical comorbidities, psychiatric disorder, substance abuse) determines the GP's treatment decisions.

A few qualitative studies further confirm the influencing role of patient's characteristics. Co-existing psychiatric disorders, cognitive impairment, and poor communication skills negatively affect the delivery of care.[26,28,29] Patient's age, vitality, frailty, prognosis, and life expectancy seem to influence medication management[33,38] and more general medical decisions.[24,29] Finally, the patient's social context was considered important for the focus of the treatment.[38]

3.4.3 | GP's characteristics

Four quantitative studies have examined the influence of main GP's characteristics on multimorbidity's clinical approach. The first study[35] showed that no tested GPs' characteristics (age, sex, seniority, and specialisation) were associated with the rate of implementation of recommendations. The second study[18] highlighted that GPs' age, practicing a form of complementary medicine, and having high proportions of patients with multimorbidity were associated with prescribe or continue a medication. The third study[44] showed that the practice size (single-handed vs group) and additional qualification of psychosomatic basic care were associated with GP's treatment decisions. The fourth study[32] showed that having a high vs low score in knowledge of appropriate prescribing recommendation (Beers criteria) was associated with the number of years in practice: the more years of experience GPs have, the lesser their knowledge. The role of clinical experience was also highlighted by a qualitative study,[33] but in this case, the effect was positive: with experience, the GPs were able to wait before initiating a new treatment or feel more secure when discontinuing or changing treatment.

Emotional strain may also play a role. A number of negative emotions seem to accompany GPs' clinical practice when dealing with multimorbidity: fear, anxiety, frustration, as well as feeling guilty, overwhelmed, isolated or inadequate.[15,17,25,27,28,33,37,39,40] These feelings appear especially when "GPs' conviction conflicts with either that of a specialist or the guidelines or when they are at the risk of being reported by patients for malpractice".[33(p73)] Studies highlighted how they may influence the GPs' clinical decisions, especially leading to clinical inertia and maintain the status quo.[37,39] Furthermore, some GPs reported that treating such patients may threaten their "resolve and resilience, leading to the negativity that might spill over into the consultation".[25 (p4)]

4 | DISCUSSION

GPs often struggle to describe the clinical reasoning processes they use, even though they are at the core of their expertise.[46,47] We also found this issue in the analysis of our results concerning multimorbidity.

GPs mostly aim to preserve the patient's quality of life, although this may sometimes mean to give secondary importance to the diagnostic approach or categorisation of symptoms, signs, and test results.[48,49] In that respect, patient's values and priorities are determining factors to be taken into account in GPs' clinical reasoning.

When GPs explicit their clinical reasoning, they describe it as something essentially intuitive. Nevertheless, our results show how GPs also use, more or less consciously, much more analytical clinical reasoning. For example, our results highlight the challenges relative to the ongoing process of prioritisation, as well as the one of always weighing up the risks and benefits for the patient. In this clinical reasoning, there is no single correct plan, but competing priorities and unavoidable uncertainties.[9,12,50]

These findings are consistent with emerging literature naming these clinical reasoning processes *therapeutic reasoning*,[51] or *management reasoning*.[11,50] As stated by Cook et al.,[9] this kind of clinical reasoning, in contrast to the search for a diagnosis, involves

negotiation with the patient, ongoing care monitoring, and continuous readjustment of the management plan.

Numerous research has shown that clinical reasoning relies on two major systems: System 1, an immediate and intuitive approach, and System 2, a more conscious and analytical approach.[52-54] Dual-process theory posits that Systems 1 and 2 are at play simultaneously.[55] The way both systems are activated is still under debate[56]; further research should be undertaken to investigate how these processes operate and interact, especially in the context of multimorbidity. According to Cook et al.,[9] we could make the hypothesis that this kind of longitudinal reasoning is even more complex, as it also requires the close collaboration of the patient and relatives, as well as the involvement of other healthcare professionals, keeping in mind that this reasoning process is never-ending. More than that, decisions or plans are made, already knowing or expecting that they will evolve and change.

This review showcases contrasting results on the role of GPs' clinical experience in their practice of prescription.[32,33] This discrepancy may echo the way GPs' organise their knowledge and the richness of their illness scripts in relation to multimorbidity.[49] Keeping in mind that how these illness scripts develop and differ potentially, remains unclear and requires further research.

Our results also highlight that there are many obstacles still to be resolved in order to implement shared decision-making processes as well as more collaborative reasoning. These findings are consistent with those of other studies.[57-62] As Wagner emphasised, medical care must be transformed into a more proactive, holistic, and collaborative model.[63,64]

The lack of guidelines adapted to multimorbidity, and the necessity to navigate these different issues make GPs feel uncertain, ill-equipped, and sometimes guilty. This last point is crucial, since it brings forth some challenges: the first lies in the need for GPs to be familiar with their clinical reasoning processes in order to make sense of their approach and value it, rather than feeling uncomfortable for not strictly following the guidelines. The second is related to teaching: the ability to supervise in the clinical setting requires an understanding of the clinical reasoning strategies that are used,[65-67] in order to explicit them to the students,[68] and prevent potential clinical reasoning difficulties.[69-71] Further research is thus needed to deepen our knowledge in this field. An increased overall understanding of these processes would allow GPs to develop an explicit role model and thereby improve their students' learning processes during supervision sessions. This will allow future generations of GPs to integrate these findings during their training and consequently, to manage to the best of their abilities the care of patients suffering from multimorbidity in their practice.

4.1 | Strengths and limitations

To the best of our knowledge, this is the first systematic review synthetising and critically discussing current evidence on the GPs' clinical reasoning processes at play during the long-term follow-up of patients suffering from multimorbidity. Some strengths of our review include its focus on a specific and clinically relevant question, a comprehensive search strategy, and a rigorous inclusion method with interrater agreement. We were able to include 32 studies[14-45] with quantitative, qualitative, and mixed-methods designs, representing an important and diversified data set. The main themes reported in this review, which were developed from data of 2 061 GPs and 2 876 medical records, indicate considerable overlap from each of the primary studies and constitute a solid scientific basis for further research.

The term "clinical reasoning" was quite rarely used in medical literature and clinical reasoning processes were almost never explicitly described, especially when it comes to the long-term follow-up of patients. To account for this, we used a broad search strategy. In addition, the search in biomedical databases was combined with that in nonbiomedical databases to ensure that relevant articles in the psychology and education literature were not missed. A major challenge of this review was to extract relevant information from data often not specifically made to answer our research question. This has required a meticulous analysis of the articles' content and a complex process of putting data into perspective. A close collaboration between reviewers with different backgrounds (psychologists and doctors specialised in family medicine and geriatrics) with proven expertise in medical education was of paramount importance to succeed in this task.

Although we performed a comprehensive search for published studies, we cannot exclude that relevant data were omitted because of the exclusion of non-English or French articles and conference abstracts. No unpublished data were obtained via contact with authors.

5 | CONCLUSIONS

Whilst GPs perceive their clinical reasoning to be predominantly intuitive, our results highlight that this kind of longitudinal reasoning is more analytical and complex, as there are many uncertainties and competing ongoing priorities to manage. Moreover, sharing their clinical reasoning with patients and other healthcare professionals remains challenging. Deepening our knowledge of these processes could allow GPs to develop an explicit understanding of their clinical reasoning processes and enable them to share these insights during their clinical supervision with trainees.

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DISCLOSURES

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Dr Cairo Notari and Prof Audétat have full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. All authors contributed substantially to this study and are in agreement with the content of the manuscript. Concept and design: Cairo Notari, Audétat; Acquisition, analysis, or interpretation of data: All authors; Drafting of the manuscript: Cairo Notari, Audétat, Sader; Critical revision of the manuscript for important intellectual content: All authors; Supervision: Cairo Notari. Final approval of the manuscript: All authors.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

ORCID

Sarah Cairo Notari https://orcid.org/0000-0003-2623-2881

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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