BMJ Open

How far are we from a medication use process aiming at well-informed adherent patients with long-term medications? A qualitative study

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2019-036526
Article Type:	Original research
Date Submitted by the Author:	19-Dec-2019
Complete List of Authors:	Mononen, Niina; University of Helsinki, Faculty of Pharmacy, Division of Pharmacology and Pharmacotherapy Pohjanoksa-Mäntylä, Marika ; University of Helsinki Airaksinen, Marja; University of Helsinki Hämeen-Anttila, Katri; Finnish Medicines Agency FIMEA, Assessment of Pharmacotherapies
Keywords:	Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Organisation of health services < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, PUBLIC HEALTH, QUALITATIVE RESEARCH, HEALTH SERVICES ADMINISTRATION & MANAGEMENT

Title	**How far are we from a medication use process aiming at well-informed adherent patients with long-term medications? A qualitative study**
Authors' names	Niina Mononen, Marika Pohjanoksa-Mäntylä, Marja Airaksinen, Katri Hämeen-Anttila
Address and position for each author	Niina Mononen, MSc (Pharm), PhD Student Marika Pohjanoksa-Mäntylä, PhD, University Lecturer Marja Airaksinen, Professor, PhD Clinical Pharmacy Group, Division of Pharmacology and Pharmacotherapy, Faculty of Pharmacy, University of Helsinki, 00014 University of Helsinki, Finland
	Katri Hämeen-Anttila, PhD, Research and Development Manager Assessment of Pharmacotherapies, Finnish Medicines Agency Fimea, P.O. Box 55, 00034 FIMEA, Finland
Corresponding author	Niina Mononen Clinical Pharmacy Group, Division of Pharmacology and Pharmacotherapy, Faculty of Pharmacy, University of Helsinki, 00014 University of Helsinki, Finland E-mail: niina.mononen@helsinki.fi Telephone: +358 (0) 2941 59917

Word count: 3580

Keywords: health policy, health services administration & management, organisation of health services, public health, qualitative research

ABSTRACT

Objective
The aim of this study was to investigate stakeholders' views on reaching the ultimate goal of the National Medicines Information Strategy of a well-coordinated medication use process integrating appropriate medicines information to ensure rational pharmacotherapy, particularly among chronically ill patients.

Design
Semi-structured interviews among stakeholders involved in the National Medicines Information Network enhancing the strategy's implementation after the first three-year strategic operational period (2012-2014) in spring 2015.

Setting
National implementation of medicines information strategy throughout the healthcare in Finland.

Participants
Members of the National Medicines Information Network (n=79/111, participation rate 71%, representing 42/53 stakeholder organisations).

Outcome measures
Well-implemented actions and actions needing development in the medication use process at: 1) infrastructure (*macro*), 2) healthcare professionals (*meso*), and 3) patient (*micro*) level.

Results
Medication counselling by community pharmacists was the most effectively implemented part of the medication use process, followed by physician's actions while starting a new medication, and advice given by nurses. The major development needs concerned: 1) poor access to patient information and its transfer in healthcare, particularly the lack of reconciled medication lists and electronic health records (*macro*); 2) poor functioning medication use process in home care and social care units, such as nursing homes (*meso*); and 3) limited patient involvement in their care (*micro*).

Conclusions
Far more actions for development than well-established practices in the medication use process were identified. Considerable improvements were reported to be needed at the infrastructure level to support the rational use of medicines at the patient level when implementing the next steps of the National Medicines Information Strategy.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- A wide range of stakeholders were interviewed providing in-depth and useful understanding how they perceived the achievement of the ultimate goal of the National Medicines Information Strategy three years after its launch.
- A majority of the stakeholder representatives were healthcare professionals, half of them being pharmacists which may have skewed the results.
- Absence of real patients with chronic illnesses and medications may distort results.
- The dynamics of the interviews may have been influenced by the fact that they were conducted as individual, pair or group interviews according to convenience of each stakeholder.
- In the conceptual model building, the breakdown of the data to macro, meso and micro levels assisted in constructing a holistic understanding of the medication use process.

INTRODUCTION

Carrying out long-term medication is a collaborative process whereby the ultimate goal is to foster well-informed patients who are capable of, and motivated to, self-manage their medications. Team-based and patient-centered care emphasises the roles and tasks of each healthcare provider involved in the care process to ensure conduct of medication in a high-quality, safe, effective, economical and rational manner.[1] Part of this collaborative team should be the patients themselves so that they can take responsibility for their own care and become empowered for self-management and self-care.[2]

Although all healthcare professionals involved in the medication use process should have clearly determined responsibilities and tasks, there still exists ambiguity in this respect.[3-5] Among healthcare professionals there is uncertainty about their own roles and tasks, as well as those of other professionals.[6-8] If the roles and tasks are not agreed upon, it can lead to preventable risk situations, medication errors or omissions.[3,9-11] It can also lead to a preventable increase in the medication-related burden for patients and impair their lived experience with the medication,[12] e.g., through inadequate support from the social and health service system at different phases of a long-term journey with a chronic illness.[13,14]

Easy access to reliable and timely health information and medicines information is an integral part of the successful medication use process for both healthcare providers and medicine users.[15-20] Professionals and medicine users need and intentionally utilise or randomly encounter a variety of information sources in different phases of the medication use process.[21] The medication use process covers activities for the needs assessment for medication, selection of the medication and prescribing, dispensing, dosing and administration, patient motivation and counselling to support adherence and self-management, treatment follow-up and assessment of outcomes.[22] The patient-specific medication plan is an important, but often missing part of the medication use process which facilitates communication regarding the medication between the patient and participating organisations and individuals.

Even though the consistent medication use process as described above is fundamental for rational pharmacotherapy, little research has focused on evaluating the entire process. In Finland, Finnish Medicines Agency Fimea launched a National Medicines Information Strategy in 2012 with the ultimate goal of a well-implemented medication use process that will result in well-informed and adherent patients by 2020.[23] The special emphasis of the Strategy is on patients with long-term medications. This study investigated stakeholders' views of reaching the goal of the Strategy at three years after its national launch in 2015.

METHODS

Context

In Finland, medicines information practices have been actively developed since the 1980s, especially in community pharmacies.[24-28] Patients have a statutory right to receive information about their medicines from their healthcare providers, physicians and pharmacists being mandated to counsel on safe and appropriate medicine use while prescribing and dispensing.[29,30] The current medicines policy 2020 prioritises the development of medicines information practices, particularly to improve coordination between medicines information providers and to enhance the use of medicines information sources in patient care.[22]

To implement these medicines policy actions set in 2011, Fimea established the first National Medicines Information Strategy in 2012.[23] The ultimate goal of the strategy is to have well-committed and motivated patients with long-term illnesses who are well aware of their care. This strategic goal is in line with the Chronic Care Model,[31,32] which was extensively piloted in Finland as a potential basis for a new social and health service system.[33] The strategy's implementation is based on the following core actions: a national medicines information network coordinated by Fimea supports that implementation and healthcare professionals' access and use of reliable information sources and services are ensured, as well as the health literacy of the general public and medicines expertise and multiprofessional medication use practices in healthcare based on national guidelines and local agreements.[23] The National Medicines Information Network established to promote the implementation of the National Medicines Information Strategy consists of four working groups and a coordination group involving a wide range of stakeholders representing medicines information providers and users (see Table 1).[23,34] The implementation of the strategy is divided into three operational periods (years 2012–2014; 2015–2017; and 2018–2020).

Study design and setting

The study applied a qualitative cross-sectional design with semi-structured interviews among the members of the National Medicines Information Network. The interviews were performed after the first three-year operational period (2012–2014) of the National Medicines Information Strategy in spring 2015. During the first period of the strategy, the Network had 111 members representing 53 stakeholder organisations. First, an invitation to participate in the interview was sent to all members of the network via email. A more detailed information letter was sent to those who agreed to participate in the study.

Interview guide

A semi-structured interview guide with two main themes and eight sub-themes focusing on the goals and actions of the National Medicines Information Strategy was developed.[23] The interview guide was pre-tested in two pilot interviews with six participants. No significant changes were made based on the pilot, and therefore, the data from the pilots were included in the study. The two main themes discussed in the interviews pertained to: 1) reaching the goals and implementing the actions of the National Medicines Information Strategy, and 2) actions taken by the National Medicines Information Network. This study focused on the first main theme and the following questions in the interview guide: “If you consider the figure of medication use process for a patient with chronic diseases, then: 1) what are the most crucial actions that have been implemented, and 2) what actions should be focused upon in the future in order to achieve the goal of a well-informed, adherent patient or medicine user?” The figure of the medication use process as illustrated in the strategy was shown to the participants to stimulate discussion during the interview (Fig. 1).[23]

Add figure 1 in here.

Data collection

Interviews were conducted as individual, pair and group interviews depending on the preference of each stakeholder in spring 2015. The aim was to have only one stakeholder organisation in each interview. Due to the geographical location and schedules of the participants, interviews were conducted face-to-face, by telephone or via video conferencing. One moderator NM (female pharmacist, MSc, with training in qualitative interviews) facilitated and audiotaped all interviews with permission from the participants.

Analysis

Data were analysed by applying the Framework Method that utilises both deductive and inductive content analysis (Fig. 2).[35] The analysis was carried out in stages using Microsoft Word and Excel (Windows 10 Home). The interviews were transcribed verbatim by a company specialised in converting to written text qualitative research data *(Stage 1)*. Each transcript was repeatedly read by one researcher (NM), while listening to the audiotapes *(Stage 2)*. Single words, sentences or groups of sentences related to study questions were coded by one researcher (NM) and verified by another researcher (MP-M) *(Stage 3)*. Any differences of interpretation were discussed with the research group. Once the key categories were identified inductively, the transcripts were purposively read to detect any discussion that deviated from these categories and an analytical matrix was developed *(Stage 4)*. Main and sub-categories were primarily developed deductively according to the medication use process[23] (Fig. 1) *(Stage 5)*. Additionally, new main and sub-categories were inductively derived from the data. Codes were classified into main categories, and the encoded data were charted into a spreadsheet generated from the analytical matrix *(Stage 6)*. Based on the existing medication use process model (Fig. 1), and complemented with participants' views identified from the interviews, a new conceptual framework of the medication use process was developed *(Stage 7)*. The results are presented in accordance with two main research questions, i.e., stakeholders' views on: 1) the well-implemented actions, and 2) the actions needing development in the medication use process. The results are classified into three operational levels: infrastructure *(macro)*, healthcare professional *(meso)* and patient *(micro)* level. This follows the conceptual framework applied to combine the functions of primary care with the dimensions of integrated care.[36] Numbers of encodings were counted according to the mentions by each participant and the summative numbers were set into the operational levels. The standards for reporting qualitative research (SRQR) was utilised when applicable.[37]

Add figure 2 in here.

Ethical considerations

We followed the guidelines of the Finnish Advisory Board on Research Integrity.[38] According to the guidelines, the study was deemed to be exempt from requiring approval from the research ethics committee. The research plan was approved by the National Medicines Information Network. Participants were informed in writing about the study prior to the interviews. Their participation was voluntary with the opportunity to withdraw from the study at any time. The recordings and interview notes were digitally stored behind a password. All data were anonymised and were accessible only to the authors.

Patient and public involvement

Patient participation was taken into account by interviewing representatives from various national patient organisations who were active partners in the National Medicines Information Network. There was no real patients or public involvement in the planning phase or design of the study. The results of the study will be discussed in the Network for further actions of the National Medicines Information Strategy.

RESULTS

In total, 79 out of 111 members of the National Medicines Information Network participated in the study (participation rate 71%) representing 42 out of 53 stakeholders (Table 1). Interviews (n=43) were conducted as individual (n=22), pair (n=11) or group interviews (n=10), either face-to-face (79%, n=34), by telephone (12%, n=5), as video conferencing (7%, n=3) or as face-to-face and video conferencing (2%, n=1). Altogether, 3–6 participants attended the group interviews at a time. Four interviews included participants from more than one stakeholder organisations. A majority of the participants were pharmacists (43% of all participants, n=34), physicians (22%, n=17) and nurses (15%, n=12). Educational units were the most commonly represented stakeholder group (24% of the stakeholder organisations, n=10), including universities, polytechnics, vocational institutions and continuing education units.

Table 1 Characteristics of the individual stakeholder representatives (n=79) and the stakeholder organisations (n=42) participating in the study. (n=number of individual stakeholder representatives or stakeholder organisations)

Stakeholders by profession	**Individual stakeholder representatives who participated in the study**		**Individual stakeholder representatives in the Network[a]**	
	n	**%**	**n**	**%**
Pharmacists	34	43.0	41	36.9
Physicians	17	21.5	22	19.8
Nurses	12	15.2	15	13.5
Others	11	13.9	21	18.9
Practical nurses	2	2.5	2	1.8
Healthcare students	1[b]	1.3	4 [b-e]	3.6
Dentists	0	0	1	0.9
Not known	2	2.5	5	4.5
Altogether	79		111	

Stakeholders by type of affiliation	**Stakeholder organisations that participated in the study**		**Stakeholder organisations represented in the Network[a]**	
	n	**%**	**n**	**%**
Healthcare centers, hospitals and hospital districts, hospital pharmacies and dispensaries, university pharmacies	8	19.0	8	15.1
Patient associations and organisations	8	19.0	10	18.9
Professional organisations	7[b,d,e]	16.7	8 [b-e]	15.1
Universities	6[b,d,e]	14.3	6[b,d,e]	11.3
Scientific societies	4[b,d,f,g]	9.5	5[b,d,f,g]	9.4
Polytechnics, vocational institutions	3[e,h]	7.1	5[e,h]	9.4
National authorities	2	4.8	3	5.7
Organisations representing pharmaceutical industry	2	4.8	2	3.8
Continuing education units	1[b]	2.4	1[b]	1.9
Student associations	1[b]	2.4	4[b-e]	7.5
Others	0	0	1	1.9
Altogether	42		53	

[a]National Medicines Information Network, [b]pharmacy, [c]dentistry, [d]medicine, [e]nursing, [f]clinical pharmacology, [g]psychiatry, [h]practical nursing.

Well-implemented actions in the medication use process

The new conceptual framework illustrating well-implemented actions in the medication use process consisted of ten main categories of actions (Fig. 3). Of these, seven were derived deductively from the previous medication use process model (Fig. 1) and three were inductively derived from the data (Fig. 3). All the inductively derived categories were at the infrastructure *(macro)* level. Around half of the participants (52%) reported well-implemented actions, mostly at the meso level (i.e., healthcare professionals). Of these actions, medication counselling by community pharmacists was considered as the best implemented (n=26 mentions), followed by physicians' performance while starting a medication (n=14), and advice and guidance provided by nurses (n=14) (Appendix A).

Add figure 3 in here.

Very few mentions of the well-implemented actions at the infrastructure *(macro)* level were present (Fig. 3). These related to the patient information transfer and electronic health records (EHRs) (n=4 mentions of being well-implemented) and multiprofessional collaboration (n=2), while none of the stakeholders mentioned management of the entire medication use process (n=0) or specialist services (n=0) as well-implemented.

Actions needing development in the medication use process

The stakeholders mentioned far more actions for development than well-established practices in the medication use process (211 vs. 68 mentions, respectively) (Fig. 3 and 4). Almost all participants (94%) raised at least one area for improvement (Fig. 4, Appendix A). The highest number of mentions indicating a need for development concerned medication use process in home care and social care *(meso)* (n=34), patient information transfer and EHRs, including update medication lists *(macro)* (n=33), and patient's management with the medication *(micro)* (n=27). At the infrastructure *(macro)* level, management of the entire medication use process (n=24) and multiprofessional collaboration (n=23) were also frequently mentioned as areas for development.

Add figure 4 in here.

In the medication use process in home care and social care units, such as nursing homes, most of the concerns related to skills, competences and inadequate training of practical nurses to appropriately manage medications of their older clients (Fig. 4). A need for additional training in pharmacotherapy was raised, particularly for home care and nursing home staff to meet the requirements of their current work duties in geriatric care. Inadequate patient information transfer between care units and limited availability of EHRs in the medication use process were among the major concerns as not all professionals involved in the care team have access to complete and accurate patient information, such as laboratory results, or when the patient is transferred from a care unit to another. In addition, many stakeholders reported that the management of the entire medication use process needed development indicating fragmentation, lack of coordination and poor collaboration between different healthcare professionals and between professionals and patients. They also expressed concerns on treatment monitoring as it was not commonly conducted very systematically.

Finally, poor patient involvement during the entire medication use process was a concern reflecting a lack of motivation or adherence to treatment and an inability or unwillingness to communicate with healthcare professionals (Fig. 4). A further concern was that patients do not always have updated medication lists or treatment plans, which may not only challenge healthcare professionals at the point of prescribing and dispensing medicines, but also patients while using medicines at home. Additionally, patients' limited skills in searching reliable health information and medicines information and insufficient medication counselling for particular patient groups, such as the deaf, people with vision impairment and using multiple medications, were identified as areas needing attention.

DISCUSSION

The stakeholders' interviews provided rich data useful to understanding how the stakeholders perceived the achievement of the ultimate goal of the National Medicines Information Strategy at three years after launch.[23] Although some well-implemented actions in the medication use process were identified, the stakeholder representatives found even more actions requiring improvement at all levels of implementation. In particular, considerable improvements were reported to be required at the infrastructure level to support the rational use of medicines at the individual patient level. The primary infrastructural development needs concerned the availability of update medication lists and other patient information in the electronic form, coordination of the entire medication use process, and defining the roles and responsibilities of professionals and patients involved in the care process. These findings are in line with other recent observations from Finland.[39-42]

The starting point of the National Medicines Information Strategy in 2012 was purely to improve coordination of medicines information and medicines information practices in healthcare.[23] However, this first strategy's evaluation in 2015 has already demonstrated that medicines information and its receipt from various sources cannot be separated from the medication use process. Furthermore, medicines information cannot be separated from patient information. This was indicated by the finding that the availability of the reconciled medication list and EHRs were highly prioritised by the stakeholders as actions to improve the management of the entire medication use process. An update medication list is essential for professionals and patients. For example, guidelines for patient-centered therapeutic counselling assume that the practitioner should review available patient information before the encounter and use the information gathered to determine what to discuss and agree on the treatment with the medicine user.[26,28,43]

Since this evaluation was conducted in 2015, shortcomings found in the infrastructure of the medication use process related to the coordination and availability of EHRs have been recognised in the ongoing Rational Pharmacotherapy Action Plan 2022.[39] The Government Program[44,45] based action plan is intended to strengthen the actions at the infrastructure level which were minor in 2015. At the same time, it extends the scope of development towards the meta level, including health and medicines policy making that can facilitate infrastructural changes in the medication use process through information guidance, resource allocation and legislation.[46]

According to the stakeholders, challenges in implementing the medication use process appear to be the greatest in primary care, especially in home care and social care units such as in nursing homes. This means social and healthcare units providing care for older adults in the poorest conditions. The result may reflect that the Finnish population is aging rapidly and the care system has not been adequately prepared for the growing need, for example, to train care personnel in geriatric pharmacotherapy to safely manage the medications. This is particularly the case for practical nurses whose responsibility for medication management in geriatric care units has increased remarkably even though their pharmacotherapy training is limited. The same trend and challenges have been found in other research and development programs in Finland and other countries.[40,47] The challenge of safe management of medications and polypharmacy of older adults have been prioritised globally in the ongoing WHO Global Patient Safety Program "Medication Without Harm".[48] Further research should focus on geriatric care units in primary and social care to better understand the systems-based root causes and contributing factors of actual and potential risks in the current medication use processes.

Patient involvement in the medication use process was strongly communicated as an area for development by professionals and representatives of patients. It is worth remembering that a majority of the interviewees were health professionals, even where they represented the voice of patients. Thus, the results are skewed to a professional opinion even in the patient perspective. Nevertheless, the results send a clear message that patients' involvement in their long-term medication should be significantly increased. To be successful, research and actions should focus on patient approach in the implementation of long-term medications. Only the patients themselves can describe the issues that matter to them affecting their motivation for treatment, success of self-management and empowerment. Even people with poor health literacy want to know about their medications.[49] However, a population survey from Finland indicated that the proportion of adult medicine users who had received information about their medicines from professionals or any source had decreased remarkably during 1999–2014.[21] Infrastructural factors leading to poor access to patient and medicines information and poor adherence, such as lack of update medication lists and treatment plans, and lack of personal communication with care providers should be further investigated from a patient perspective.[13,50] These aspects have been recognised in Finland in the ongoing Rational Pharmacotherapy Action Plan for forming partnerships along with improving overall management and coordination of the medication use process as keynotes of the Plan.[39]

Strengths and limitations of this study

Semi-structured interviews amply covered the whole range of stakeholders actively involved in implementing the National Medicines Information Strategy. They can be assumed to be informants with the best understanding of the topic of research. However, a majority of the stakeholder representatives were healthcare professionals, half of them being pharmacists which may have skewed the results. There was also an absence of real patients with chronic illnesses and medications which may distort results. The dynamics of the interviews may have been influenced by the fact that they were conducted as individual, pair or group interviews according to convenience of each stakeholder. The data from different types of interviews were combined and the relative power of the opinions was determined by counting the mentions for each action. The profession or stakeholder group was not specified during the analysis, as the aim was to obtain an overall understanding of the implementation of medication use process rather than to compare views between professions or stakeholders.

The figure of the medication use process was an important tool in the interviews to keep the discussion focused on core issues.

In the conceptual model building, it was useful to use the breakdown of the data to macro, meso and micro levels. *Trustworthiness* of the analysis process was confirmed in every phase, including the preparation, organisation and reporting of results.[51] To ensure the *credibility*, a previously known model of a medication use process[23] was used as an analysis matrix, supplemented with the main and sub-categories identified inductively from the data. Additionally, a theoretical method used previously in healthcare research[35] was applied in analysing data to strengthen *credibility*. To increase the *comprehensivity* of the study, two researchers – and when necessary the whole research group – were involved in the data analysis process. The content and structure of concepts created by content analysis were illustrated with the examples of quotations from various participants to indicate *conformability* and *objectivity*. The models created in this study may be used when evaluating the medication use process in other social and healthcare settings (*transferability*).

Implications and future research

The medication use process of chronically ill patients using long-term medications requires development at every level of implementation. The major development needs in the infrastructure concern the coordination of care, transfer of patient information between care units, availability of a reconciled medication list, and local and national agreements on responsibilities of patients and professionals involved in the medication use process. The most urgent development needs at professional level focus on the entire medication use process in primary and social care, particularly in geriatric units where practical nurses' competences do not meet their actual work responsibilities. The current medication use process lacks genuine patient-centeredness, manifested by a lack of adherence, motivation and communication, and the inability of patients to retrieve information. Patients on long-term medications need to be better involved in implementing their treatment by improving empowerment and partnership, and by finding new ways to support self-management and treatment commitment.

CONCLUSIONS

Weaknesses in the infrastructure of the medication use process reflecting on the transfer of patient information, poorly functioning medication use processes in primary care and limited participation of patients in their care are priority areas while implementing the next steps of the National Medicines Information Strategy. Many of the challenges identified in this evaluation have been taken into consideration in the strategy's implementation since 2015, the major challenges also in the Rational Pharmacotherapy Action Plan 2018–2022 by the Ministry of Social Affairs and Health.

Acknowledgements The authors gratefully acknowledge the members of the Finnish National Medicines Information Network who participated in this study. The authors acknowledge the Elli Turunen Fund of the Finnish Cultural Foundation for providing funding. The authors warmly thank Perihan Ipek for assistance in collecting the data, and AMNielsen ApS and Chelsea Schneider for proofreading the manuscript.

Contributors NM, MA, MP-M and KH-A have been involved in designing the study, developing the interview guide, planning the analysis and reporting this particular study. NM performed the interviews and data analysis. MP-M verified the codings of the data. MA, MP-M and KH-A contributed in the interpretation of the data. NM prepared the initial draft of the manuscript. MA, MP-M and KH-A critically reviewed and revised the manuscript. All authors read and gave the final approval of the version to be published.

Funding This research was supported by the Elli Turunen Fund of the Finnish Cultural Foundation. The sponsors had no role in design and conduct of the study; collection, management, analysis, and interpretation of the data; or in preparation, review, or approval of the manuscript.

Competing interests None declared.

Patient consent for publication Not required.

Data availability statement No additional data available.

REFERENCES

1 World Health Organization. Innovative care for chronic conditions: Building blocks for actions. Global report. World Health Organization, 2002. www.who.int/chp/knowledge/publications/icccreport/en/ (Accessed 10 Dec 2019).

2 World Health Organization. Adherence to long-term therapies: Evidence for action. World Health Organization, 2003. www.who.int/chp/knowledge/publications/adherence_report/en/ (Accessed 10 Dec 2019).

3 Celio J, Ninane F, Bugnon O, Schneider MP. Pharmacist-nurse collaborations in medication adherence-enhancing interventions: A review. *Patient Educ Couns* 2018;101:1175–92.

4 Olsen CF, Bergland A, Debesay J, Bye A, Langaas AG. Striking a balance: Health care providers' experiences with home-based, patient-centered care for older people – A meta-synthesis of qualitative studies. *Patient Educ Couns* 2019;102:1991–2000.

5 Toivo T, Dimitrow M, Puustinen J, et al. Coordinating resources for prospective medication risk management of older home care clients in primary care: Procedure development and RCT study design for demonstrating its effectiveness. *BMC Geriatr* 2018;18:74.

6 Elvey R, Hassell K, Hall J. Who do you think you are? Pharmacists' perceptions of their professional identity. *Int J Pharm Pract* 2013;21:322–32.

7 Kusi-Appiah E, Dahlke S, Stahlke S. Nursing care providers' perceptions on their role contributions in patient care: An integrative review. *J Clin Nurs* 2018;27:3830–45.

8 Lawrence RA, McLoone JK, Wakefield CE, Cohn RJ. Primary care physicians' perspectives of their role in cancer care: A systematic review. *J Gen Intern Med* 2016;31:1222–36.

9 Berland A, Bentsen SB. Medication errors in home care: A qualitative focus group study. *J Clin Nurs* 2017;26:3734–41.

10 Teinilä T, Kaunisvesi K, Airaksinen M. Primary care physicians' perceptions of medication errors and error prevention in cooperation with community pharmacists. *Res Social Adm Pharm* 2011;7:162–79.

11 van Sluisveld N, Zegers M, Natsch S, Wollersheim H. Medication reconciliation at hospital admission and discharge: Insufficient knowledge, unclear task reallocation and lack of collaboration as major barriers to medication safety. *BMC Health Serv Res* 2012;12:170.

12 Mohammed AM, Moles RJ, Chen TF. Medication-related burden and patients' lived experience with medicine: A systematic review and metasynthesis of qualitative studies. *BMJ Open* 2016;6:e010035.

13 Kekäle M. Chronic myeloid leukemia patients' adherence to tyrosine kinase inhibitors in Finland: A journey of eighty-six patients [dissertation]. University of Helsinki, 2016. http://urn.fi/URN:ISBN:978-951-51-2353-4.

14 Puspitasari HP, Aslani P, Krass I. Pharmacists' and cosumers' viewpoints on counselling on prescription medicines in Australian community pharmacies. *Int J Pharm Pract* 2010;18:202–8.

15 Chisholm-Burns MA, Lee JK, Spivey CA, et al. US pharmacists' effect as team members on patient care: Systematic review and meta-analyses. *Med Care* 2010;48:923–33.

16 European Commission. High Level Pharmaceutical Forum 2005-2008: Conclusions and recommendations. European Communities, 2008. https://publications.europa.eu/en/publication-detail/-/publication/4fddf639-47cc-4f90-9964-142757d2515a (Accessed 10 Dec 2019).

17 International Pharmaceutical Federation. Medicines information: strategic development. The Hague: International Pharmaceutical Federation, 2017. www.fip.org/www/streamfile.php?filename=fip/publications/2017-01-Medicines-information-strategic-development.pdf (Accessed 10 Dec 2019).

18 Ryan R, Santesso N, Lowe D, et al. Interventions to improve safe and effective medicines use by consumers: An overview of systematic reviews. *Cochrane Database Syst Rev* 2014;CD007768.

19 Van Camp YP, Van Rompaey B, Elseviers MM. Nurse-led interventions to enhance adherence to chronic medication: Systematic review and meta-analysis of randomised controlled trials. *Eur J Clin Pharmacol* 2013;69:761–70.

20 Zolnierek KBH, DiMatteo MR. Physician communication and patient adherence to treatment: A meta-analysis. *Med Care* 2009;47:826–34.

21 Mononen N, Airaksinen MSA, Hämeen-Anttila K, Helakorpi S, Pohjanoksa-Mäntylä M. Trends in the receipt of medicines information among Finnish adults in 1999–2014: A nationwide repeated cross-sectional survey. *BMJ Open* 2019;9:e026377.

22 Ministry of Social Affairs and Health. Medicines Policy 2020: Towards efficient, safe, rational and cost effective use of medicines. Publications of the Ministry of Social Affairs and Health, 2011. http://urn.fi/URN:ISBN:978-952-00-3165-7 (Accessed 10 Dec 2019).

23 Finnish Medicines Agency Fimea. Rational use of medicines through information and guidance – Medicines information services: Current state and strategy for 2020. Serial Publication Fimea Develops, Assesses and Informs, 2012. http://urn.fi/URN:ISBN:978-952-5624-21-2 (Accessed 10 Dec 2019).

24 Airaksinen M, Ahonen R, Enlund H. The questions to ask about your medicines campaign – An evaluation of pharmacists and the public's response. *Med Care* 1998;36:422–7.

25 Kansanaho H. Implementation of the principles of patient counselling into practice in Finnish community pharmacies [dissertation]. University of Helsinki, 2006. http://urn.fi/URN:ISBN:952-10-2877-7.

26 Mononen N, Järvinen R, Hämeen-Anttila K, et al. A national approach to medicines information research: A systematic review. *Res Social Adm Pharm* 2018;14:1106–24.

27 Pohjanoksa-Mäntylä M. Medicines information sources and services for consumers: A special focus on the Internet and people with depression [dissertation]. University of Helsinki, 2010. http://urn.fi/URN:ISBN:978-952-10-6128-8.

28 Puumalainen I. Development of instruments to measure the quality of patient counselling [dissertation]. University of Kuopio, 2005. http://urn.fi/URN:ISBN:951-27-0053-0.

29 Medicines Act (Finland) 395/1987. https://www.finlex.fi/fi/laki/ajantasa/1987/19870395 (Accessed 10 Dec 2019).

30 Decree on the prescription of medicines 1088/2010. https://www.finlex.fi/fi/laki/alkup/2010/20101088 (Accessed 10 Dec 2019).

31 Wagner E.H. Chronic disease management: What will it take to improve cafe for chronic illness? *Eff Clin Pract* 1998;1:2–4.

32 Wagner EH, Austin BT, Hindmarsh M, Schaefer J, Bonomi A. Improving chronic illness care: Translating evidence into action. *Health Aff (Millwood)* 2001;20:64–78.

33 Nikander J, Tuominen-Thuesen M. National development programme for social welfare and health care (KASTE 2010–2015) External evaluation – Final report. Reports and memorandums of the Ministry of Social Affairs and Health, 2016. http://urn.fi/URN:ISBN:978-952-00-3800-7 (Accessed 10 Dec 2019).

34 Hämeen-Anttila K, Luhtanen S, Airaksinen M, Pohjanoksa-Mäntylä M. Developing a national medicines information strategy in Finland – A stakeholders' perspective on the strengths, challenges and opportunities in medicines information. *Health Policy* 2013;111:200–5.

35 Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Med Res Methodol* 2013;13:117.

36 Valentijn PP, Schepman SM. Understanding integrated care: A comprehensive conceptual framework based on the integrative functions on primary care. *Int J Integr Care* 2013;13:e010.

37 O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med* 2014;89:1245–51.

38 Finnish National Board on Research Integrity TENK. The ethical principles of research with human participants and ethical review in the human sciences in Finland. www.tenk.fi/sites/tenk.fi/files/Ihmistieteiden_eettisen_ennakkoarvioinnin_ohje_2019.pdf (Accessed 10 Dec 2019).

39 Hämeen-Anttila K, Närhi U, Tahvanainen H. Rational Pharmacotherapy action plan – Final report. Reports and memorandums of the Ministry of Social Affairs and Health, 2018. http://urn.fi/URN:ISBN:978-952-00-3930-1 (Accessed 10 Dec 2019).

40 Kallio S, Kumpusalo-Vauhkonen A, Järvensivu T, Mäntylä A, Pohjanoksa-Mäntylä M, Airaksinen M. Towards interprofessional networking in medication management of the aged: Current challenges and potential solutions in Finland. *Scand J Prim Health Care* 2016;34:368–76.

41 Keskimäki I, Tynkkynen LK, Reissell E, et al. Finland: Health system review. *Health Systems in Transition* 2019;21:1–166.

42 Kilpeläinen K, Parikka S, Koponen P, et al. Finnish experiences of health monitoring: Local, regional, and national data sources for policy evaluation. *Glob Health Action* 2016;9:28824.

43 United States Pharmacopeia. Medication counselling behavior guidelines. United States Pharmacopeia, 1997.

44 Prime Minister's Office. Finland, a land of solutions – Strategic programme of Prime Minister Juha Sipilä's Government 29 May 2015. Government Publications, 2015. https://vnk.fi/documents/10184/1427398/Ratkaisujen+Suomi_EN_YHDISTETTY_netti.pdf/8d2e1a66-e24a-4073-8303-ee3127fbfcac/Ratkaisujen+Suomi_EN_YHDISTETTY_netti.pdf (Accessed 10 Dec 2019).

45 Finnish Government. Programme of Prime Minister Antti Rinne's Government 6 June 2019: inclusive and competent Finland – A socially, economically and ecologically sustainable society. Publications of the Finnish Government, 2019. http://urn.fi/URN:ISBN:978-952-287-760-4 (Accessed 10 Dec 2019).

46 Guler S, Hurton, S, winn MC, Molinari M. Levels in decision making and techniques for clinicians. *International Journal of Digestive Diseases* 2015;1.

47 Sawan M, Jeon YH, Chen TF. Relationship between organizational culture and the use of psychotropic medicines in nursing homes: A systematic integrative review. *Drugs Aging* 2018;35:189–211.

48 World Health Organization. Medication without harm: Global patient safety challenge on medication safety. World Health Organization, 2017. www.who.int/patientsafety/medication-safety/medication-without-harm-brochure/en/ (Accessed 10 Dec 2019).

49 Cordina M, Hämeen-Anttila K, Lauri J, Tabone S, Enlund H. Health and medication literacy and the desire to participate in pharmacotherapy decision making – Comparison of two countries. *Res Social Adm Pharm* 2018;14:817–23.

50 Airaksinen M, Hämeen-Anttila K, Saastamoinen L. Effective use of research data: Research strategy for rational pharmacotherapy 2018–2022. Reports and memorandums of the Ministry of Social Affairs and Health, 2018. http://urn fi/URN:ISBN:978-952-00-3905-9 (Accessed 10 Dec 2019).

51 Elo S, Kääriäinen M, Kanste O, Pölkki T, Utriainen K, Kyngäs H. Qualitative content analysis: A focus on trustworthiness. *SAGE Open* 2014;4.

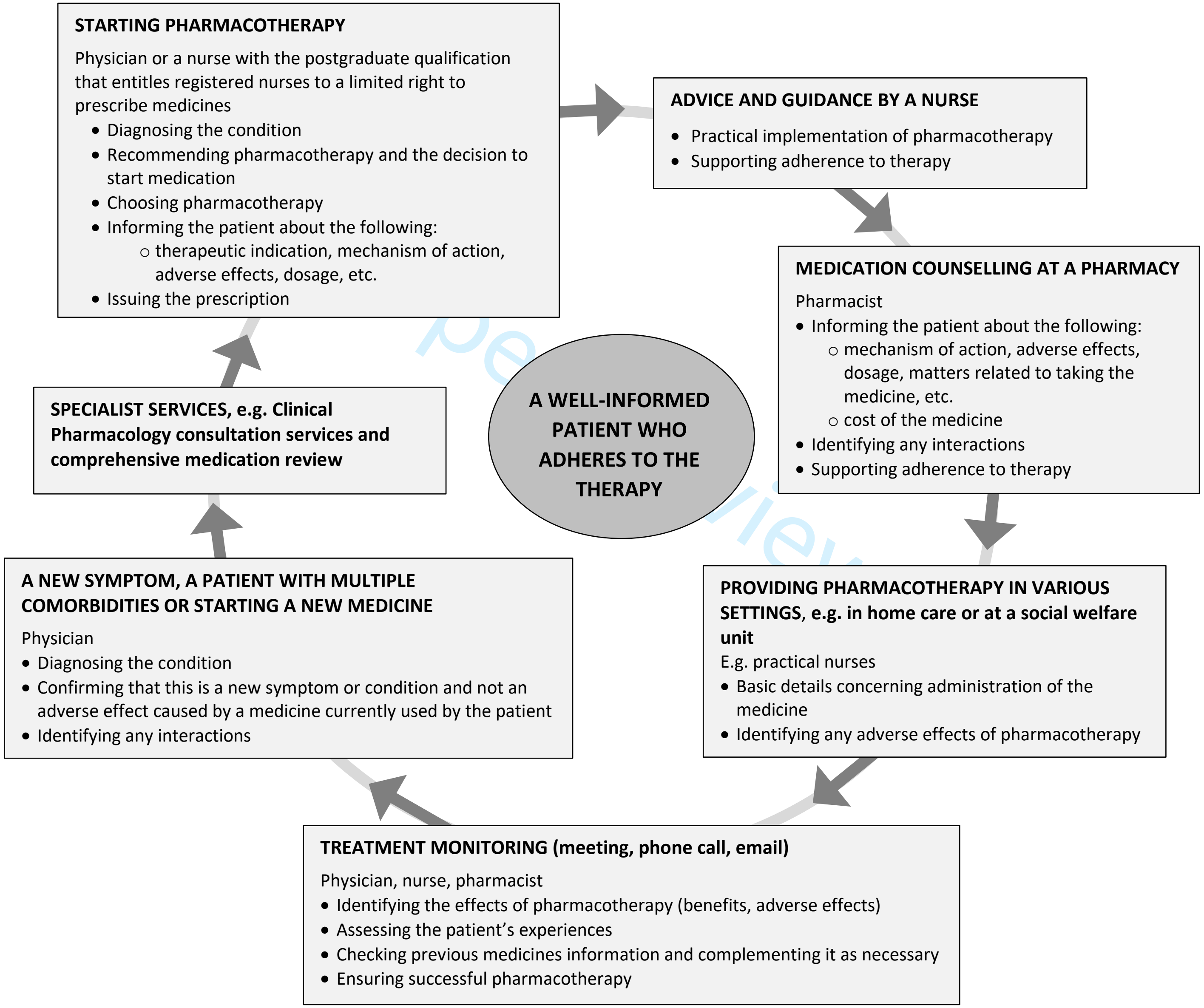
LEGENDS OF THE FIGURES

Fig. 1 Medicine use process for patients with chronic illnesses as illustrated in the National Medicines Information Strategy (© Fimea 2012).[23]

Fig. 2 Content analysis process applying the Framework Method.[35]

Fig. 3 Stakeholders' views on well-implemented actions in medication use process for patients with chronic illnesses. Categories derived deductively are marked as blue (n=7) and categories emerged inductively from the stakeholders' interviews are marked as green (n=3). (n=a summative of number of the single interviewee's mentions, HCP=healthcare professional)

Fig. 4 Stakeholders' views on actions needing development in medication use process for patients with chronic illnesses. Categories derived deductively are marked as blue (n=7) and categories emerged inductively from the stakeholders' interviews are marked as green (n=3). (n=a summative of number of the single interviewee's mentions, HCP=healthcare professional)



A WELL-INFORMED PATIENT WHO ADHERES TO THE THERAPY

STARTING PHARMACOTHERAPY

Physician or a nurse with the postgraduate qualification that entitles registered nurses to a limited right to prescribe medicines

- Diagnosing the condition
- Recommending pharmacotherapy and the decision to start medication
- Choosing pharmacotherapy
- Informing the patient about the following:
    - therapeutic indication, mechanism of action, adverse effects, dosage, etc.
- Issuing the prescription

ADVICE AND GUIDANCE BY A NURSE

- Practical implementation of pharmacotherapy
- Supporting adherence to therapy

MEDICATION COUNSELLING AT A PHARMACY

Pharmacist

- Informing the patient about the following:
    - mechanism of action, adverse effects, dosage, matters related to taking the medicine, etc.
    - cost of the medicine
- Identifying any interactions
- Supporting adherence to therapy

PROVIDING PHARMACOTHERAPY IN VARIOUS SETTINGS, e.g. in home care or at a social welfare unit

E.g. practical nurses

- Basic details concerning administration of the medicine
- Identifying any adverse effects of pharmacotherapy

TREATMENT MONITORING (meeting, phone call, email)

Physician, nurse, pharmacist

- Identifying the effects of pharmacotherapy (benefits, adverse effects)
- Assessing the patient's experiences
- Checking previous medicines information and complementing it as necessary
- Ensuring successful pharmacotherapy

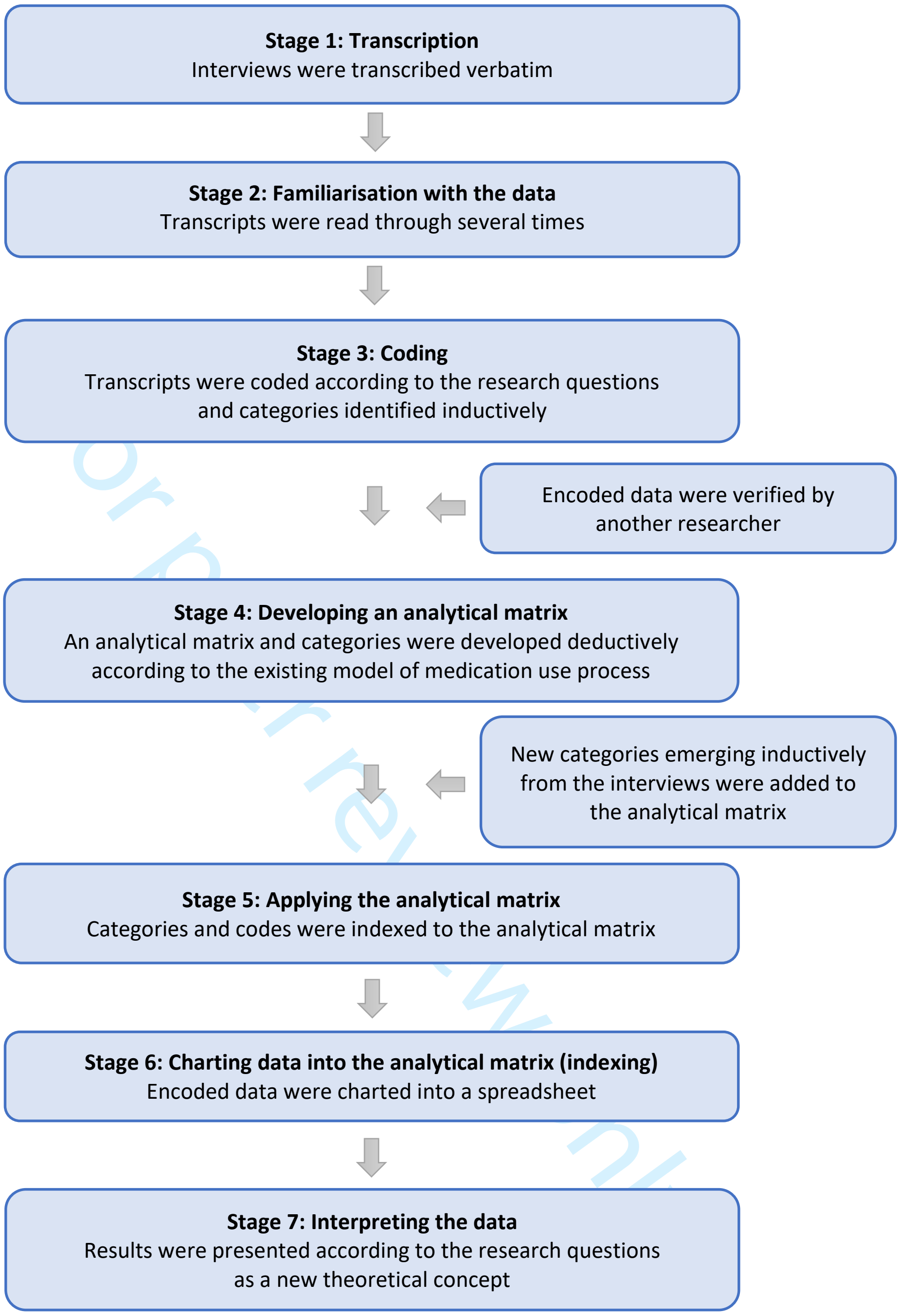
A NEW SYMPTOM, A PATIENT WITH MULTIPLE COMORBIDITIES OR STARTING A NEW MEDICINE

Physician

- Diagnosing the condition
- Confirming that this is a new symptom or condition and not an adverse effect caused by a medicine currently used by the patient
- Identifying any interactions

SPECIALIST SERVICES, e.g. Clinical Pharmacology consultation services and comprehensive medication review

Figure 1



Stage 1: Transcription
Interviews were transcribed verbatim

Stage 2: Familiarisation with the data
Transcripts were read through several times

Stage 3: Coding
Transcripts were coded according to the research questions and categories identified inductively

Encoded data were verified by another researcher

Stage 4: Developing an analytical matrix
An analytical matrix and categories were developed deductively according to the existing model of medication use process

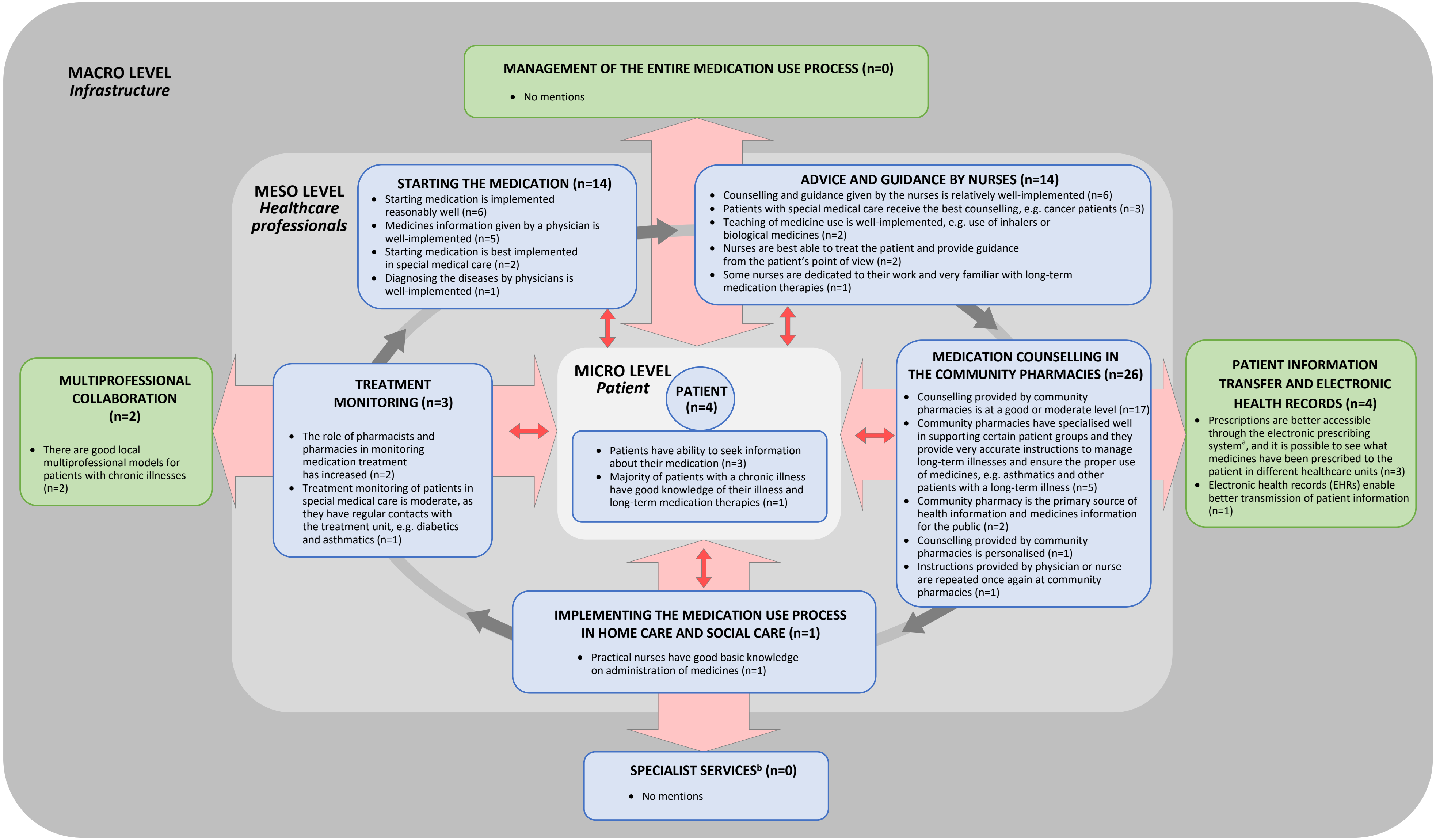
New categories emerging inductively from the interviews were added to the analytical matrix

Stage 5: Applying the analytical matrix
Categories and codes were indexed to the analytical matrix

Stage 6: Charting data into the analytical matrix (indexing)
Encoded data were charted into a spreadsheet

Stage 7: Interpreting the data
Results were presented according to the research questions as a new theoretical concept

Figure 2



MANAGEMENT OF THE ENTIRE MEDICATION USE PROCESS (n=0)

- No mentions

STARTING THE MEDICATION (n=14)

- Starting medication is implemented reasonably well (n=6)
- Medicines information given by a physician is well-implemented (n=5)
- Starting medication is best implemented in special medical care (n=2)
- Diagnosing the diseases by physicians is well-implemented (n=1)

ADVICE AND GUIDANCE BY NURSES (n=14)

- Counselling and guidance given by the nurses is relatively well-implemented (n=6)
- Patients with special medical care receive the best counselling, e.g. cancer patients (n=3)
- Teaching of medicine use is well-implemented, e.g. use of inhalers or biological medicines (n=2)
- Nurses are best able to treat the patient and provide guidance from the patient's point of view (n=2)
- Some nurses are dedicated to their work and very familiar with long-term medication therapies (n=1)

MULTIPROFESSIONAL COLLABORATION (n=2)

- There are good local multiprofessional models for patients with chronic illnesses (n=2)

TREATMENT MONITORING (n=3)

- The role of pharmacists and pharmacies in monitoring medication treatment has increased (n=2)
- Treatment monitoring of patients in special medical care is moderate, as they have regular contacts with the treatment unit, e.g. diabetics and asthmatics (n=1)

PATIENT (n=4)

- Patients have ability to seek information about their medication (n=3)
- Majority of patients with a chronic illness have good knowledge of their illness and long-term medication therapies (n=1)

MEDICATION COUNSELLING IN THE COMMUNITY PHARMACIES (n=26)

- Counselling provided by community pharmacies is at a good or moderate level (n=17)
- Community pharmacies have specialised well in supporting certain patient groups and they provide very accurate instructions to manage long-term illnesses and ensure the proper use of medicines, e.g. asthmatics and other patients with a long-term illness (n=5)
- Community pharmacy is the primary source of health information and medicines information for the public (n=2)
- Counselling provided by community pharmacies is personalised (n=1)
- Instructions provided by physician or nurse are repeated once again at community pharmacies (n=1)

PATIENT INFORMATION TRANSFER AND ELECTRONIC HEALTH RECORDS (n=4)

- Prescriptions are better accessible through the electronic prescribing system[a], and it is possible to see what medicines have been prescribed to the patient in different healthcare units (n=3)
- Electronic health records (EHRs) enable better transmission of patient information (n=1)

IMPLEMENTING THE MEDICATION USE PROCESS IN HOME CARE AND SOCIAL CARE (n=1)

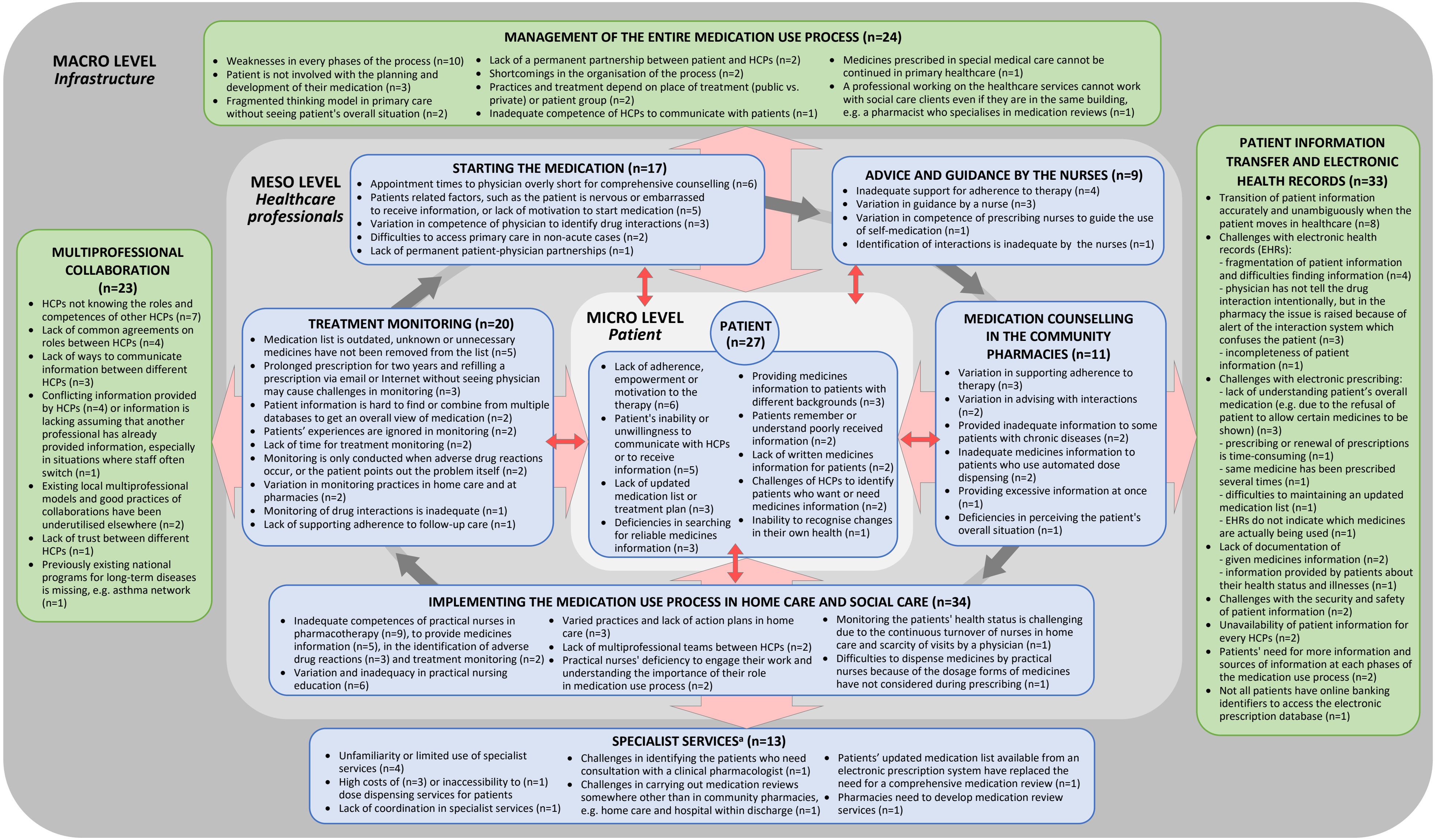
- Practical nurses have good basic knowledge on administration of medicines (n=1)

SPECIALIST SERVICES[b] (n=0)

- No mentions

[a]All prescriptions must be electronically prescribed from 1 January 2017, [b]e.g. clinical pharmacology consultation services and comprehensive medication reviews.

Figure 3



MACRO LEVEL
Infrastructure

MANAGEMENT OF THE ENTIRE MEDICATION USE PROCESS (n=24)

- Weaknesses in every phases of the process (n=10)
- Patient is not involved with the planning and development of their medication (n=3)
- Fragmented thinking model in primary care without seeing patient's overall situation (n=2)
- Lack of a permanent partnership between patient and HCPs (n=2)
- Shortcomings in the organisation of the process (n=2)
- Practices and treatment depend on place of treatment (public vs. private) or patient group (n=2)
- Inadequate competence of HCPs to communicate with patients (n=1)
- Medicines prescribed in special medical care cannot be continued in primary healthcare (n=1)
- A professional working on the healthcare services cannot work with social care clients even if they are in the same building, e.g. a pharmacist who specialises in medication reviews (n=1)

MULTIPROFESSIONAL COLLABORATION (n=23)

- HCPs not knowing the roles and competences of other HCPs (n=7)
- Lack of common agreements on roles between HCPs (n=4)
- Lack of ways to communicate information between different HCPs (n=3)
- Conflicting information provided by HCPs (n=4) or information is lacking assuming that another professional has already provided information, especially in situations where staff often switch (n=1)
- Existing local multiprofessional models and good practices of collaborations have been underutilised elsewhere (n=2)
- Lack of trust between different HCPs (n=1)
- Previously existing national programs for long-term diseases is missing, e.g. asthma network (n=1)

MESO LEVEL
Healthcare professionals

STARTING THE MEDICATION (n=17)

- Appointment times to physician overly short for comprehensive counselling (n=6)
- Patients related factors, such as the patient is nervous or embarrassed to receive information, or lack of motivation to start medication (n=5)
- Variation in competence of physician to identify drug interactions (n=3)
- Difficulties to access primary care in non-acute cases (n=2)
- Lack of permanent patient-physician partnerships (n=1)

ADVICE AND GUIDANCE BY THE NURSES (n=9)

- Inadequate support for adherence to therapy (n=4)
- Variation in guidance by a nurse (n=3)
- Variation in competence of prescribing nurses to guide the use of self-medication (n=1)
- Identification of interactions is inadequate by the nurses (n=1)

TREATMENT MONITORING (n=20)

- Medication list is outdated, unknown or unnecessary medicines have not been removed from the list (n=5)
- Prolonged prescription for two years and refilling a prescription via email or Internet without seeing physician may cause challenges in monitoring (n=3)
- Patient information is hard to find or combine from multiple databases to get an overall view of medication (n=2)
- Patients' experiences are ignored in monitoring (n=2)
- Lack of time for treatment monitoring (n=2)
- Monitoring is only conducted when adverse drug reactions occur, or the patient points out the problem itself (n=2)
- Variation in monitoring practices in home care and at pharmacies (n=2)
- Monitoring of drug interactions is inadequate (n=1)
- Lack of supporting adherence to follow-up care (n=1)

MICRO LEVEL
Patient

PATIENT (n=27)

- Lack of adherence, empowerment or motivation to the therapy (n=6)
- Patient's inability or unwillingness to communicate with HCPs or to receive information (n=5)
- Lack of updated medication list or treatment plan (n=3)
- Deficiencies in searching for reliable medicines information (n=3)
- Providing medicines information to patients with different backgrounds (n=3)
- Patients remember or understand poorly received information (n=2)
- Lack of written medicines information for patients (n=2)
- Challenges of HCPs to identify patients who want or need medicines information (n=2)
- Inability to recognise changes in their own health (n=1)

MEDICATION COUNSELLING IN THE COMMUNITY PHARMACIES (n=11)

- Variation in supporting adherence to therapy (n=3)
- Variation in advising with interactions (n=2)
- Provided inadequate information to some patients with chronic diseases (n=2)
- Inadequate medicines information to patients who use automated dose dispensing (n=2)
- Providing excessive information at once (n=1)
- Deficiencies in perceiving the patient's overall situation (n=1)

PATIENT INFORMATION TRANSFER AND ELECTRONIC HEALTH RECORDS (n=33)

- Transition of patient information accurately and unambiguously when the patient moves in healthcare (n=8)
- Challenges with electronic health records (EHRs):
  - fragmentation of patient information and difficulties finding information (n=4)
  - physician has not tell the drug interaction intentionally, but in the pharmacy the issue is raised because of alert of the interaction system which confuses the patient (n=3)
  - incompleteness of patient information (n=1)
- Challenges with electronic prescribing:
  - lack of understanding patient's overall medication (e.g. due to the refusal of patient to allow certain medicines to be shown) (n=3)
  - prescribing or renewal of prescriptions is time-consuming (n=1)
  - same medicine has been prescribed several times (n=1)
  - difficulties to maintaining an updated medication list (n=1)
  - EHRs do not indicate which medicines are actually being used (n=1)
- Lack of documentation of
  - given medicines information (n=2)
  - information provided by patients about their health status and illnesses (n=1)
- Challenges with the security and safety of patient information (n=2)
- Unavailability of patient information for every HCPs (n=2)
- Patients' need for more information and sources of information at each phases of the medication use process (n=2)
- Not all patients have online banking identifiers to access the electronic prescription database (n=1)

IMPLEMENTING THE MEDICATION USE PROCESS IN HOME CARE AND SOCIAL CARE (n=34)

- Inadequate competences of practical nurses in pharmacotherapy (n=9), to provide medicines information (n=5), in the identification of adverse drug reactions (n=3) and treatment monitoring (n=2)
- Variation and inadequacy in practical nursing education (n=6)
- Varied practices and lack of action plans in home care (n=3)
- Lack of multiprofessional teams between HCPs (n=2)
- Practical nurses' deficiency to engage their work and understanding the importance of their role in medication use process (n=2)
- Monitoring the patients' health status is challenging due to the continuous turnover of nurses in home care and scarcity of visits by a physician (n=1)
- Difficulties to dispense medicines by practical nurses because of the dosage forms of medicines have not considered during prescribing (n=1)

SPECIALIST SERVICES[a] (n=13)

- Unfamiliarity or limited use of specialist services (n=4)
- High costs of (n=3) or inaccessibility to (n=1) dose dispensing services for patients
- Lack of coordination in specialist services (n=1)
- Challenges in identifying the patients who need consultation with a clinical pharmacologist (n=1)
- Challenges in carrying out medication reviews somewhere other than in community pharmacies, e.g. home care and hospital within discharge (n=1)
- Patients' updated medication list available from an electronic prescription system have replaced the need for a comprehensive medication review (n=1)
- Pharmacies need to develop medication review services (n=1)

[a] e.g. clinical pharmacology consultation services and comprehensive medication reviews.

Figure 4

Appendix A. Illustrative examples of the expressions (translated from Finnish) mentioned by the interviewees on the well-implemented actions and actions needing development in the medication use process categorised by main categories (n=10) emerged from the interviews. (P=participant of the study)

MAIN CATEGORIES	WELL-IMPLEMENTED ACTIONS	ACTIONS NEEDING DEVELOPMENT
Infrastructure level *(macro)*		
Management of the entire medication use process	No mentions.	“Well, it’s not an individual employee, but the entire medication use process should be better organised...” *[representative from the hospital, P72]* “And it also happens in primary healthcare, that they do identify a single illness or health problem but do not take account the person as a whole. This represents a fragmented way of thinking.” *[representative from the university, P42]*
Patient information transfer and electronic health records	"Electronic prescriptions have provided more clarity [to the medication use process]... via electronic prescription, with both nurses and physician providing patient care, for example for elderly people have a more comprehensive and updated view on patients’ medication than previously. It has been a great improvement...” *[representative from the university, P40]*	“Numerous investigations have identified problems, such as lack of critical patient information or incorrect information transfer, in the medication use process. It’s scary. In a way, it pulls the plug out of many things.” *[representative from the scientific society, P66]* “Well, I think we should pay attention to how medications are recorded in the electronic health records and how information is safely visible there. That’s catastrophic, that the same medicine may be listed there many times. But instead there is no information on when medication has been started or discontinued. [Medication] lists don’t update themselves, but someone needs to reconcile them.” *[representative from the healthcare center, P9]*
Multiprofessional collaboration	*“*Excellent local multiprofessional models for cooperation, particularly in long-term patient care, already exist.*”* *[representative form the national authority, P6]*	“Healthcare professionals should know better the tasks and responsibilities of each other, and, on the other hand, should also be familiar with each other’s knowledge, and what they can and cannot do.” *[representative from the university, P40]* “Do we know the skills of different health professionals [participating in the medication use process] well enough and how we could make optimal use of them. On the other hand, can we fully trust other professions.” *[representative from the professional organisation, P18]*
Specialist services	No mentions.	“Comprehensive medication reviews... big efforts should be made to make the reviews available to patients in need, so that they don’t have to pay for them themselves. This referral policy or some other way, such as the implementation of medication reviews at the pharmacies, is still unrealised. *[representative from the professional organisation, P23]*

Healthcare professionals level *(meso)*		
Starting the medication	“Starting the medication works rather well at the moment. It is always a physician who diagnoses a disease and counsels the patient how to manage their disease and treatment. Additionally, there is also a nurse commonly involved in counselling. Especially from the perspective of special care, this stage of the medication use process seems to work.” *[representative from the hospital districts, P73]* “Starting the medication, I think it works relatively well.” *[representative from the university, P69]*	“As a physician, I commonly prescribe medicines. While prescribing, there is often limited time for medication counselling. You just really manage to say that “here is your prescription and inform how patient should take her/his medication.” *[representative from the patient organisation, P71]* “Usually, patients are not very responsive to counselling, they may not remember what they have been told during the physician’s visit. *[representative from the professional organisation, P51]*
Advice and guidance by nurses	“I do have the belief that while the nurses and midwifes have limited prescribing rights, they also have a good knowledge on what to tell patients about medicines.” *[representative from the patient organisation, P56]* “And of course, In special medical care, patients will receive the best counselling on their medicines. This concerns for example cancer patients.” *[representative from community pharmacy, P64]*	“Advice and guidance given by a nurse varies greatly depending on the resources and indications.” *[representative from the patient organisation, P71]* ”Nurses should support their patients’ adherence.” *[representative from the professional organisation, P26]* “Nurses may not counsel patients much about drug-drug interactions, although it would be really crucial for all patients.” *[representative from the polytechnic, P74]*
Medication counselling in the community pharmacies	“The best knowledge about medicines is really in the community pharmacies.” *[representative from the professional organisation, P50]* “The process is best implemented in community pharmacies. There has been a systematic attempt to develop medication counselling for patients with certain diseases, such as asthma and other chronic diseases.” *[representative from the scientific society, P59]*	”Pharmacists should not give as much information about medicines as they currently do. It is probably because they wish to play safe and explain all the possible adverse drug reactions and all other things. It may result in decreased adherence.” *[representative from the university, P78]* “Supporting medication adherence, I do not know, maybe it is supported in some way, but I also think there occurs [among healthcare professionals] some paternalistic ways of thinking. They may consider that there is no need to tell everything. If the physician prescribes and counsels something, the patient should just take his or her medication and follow instructions.” *[representative from the university, P28]*

Implementing the medication use process in home care and social care	"I would believe and really hope that practical nurses have a good basic knowledge on the administration of medicines." *[representative from the university, P76]*	"There is quite a lot of variation in nursing education as I understand it, because the aims of the education are formulated relatively loosely, and it depends on the local possibilities." *[representative from the university, P40]* "This medication use process is as strong as its weakest and less educated link, which commonly is a practical nurse or assistant or even an entirely untrained person who medicates patients. It is not certain if they have updated information and knowledge. Either they may not have for example ability to identify adverse drug reactions." *[representative from the patient association, P49]*
Treatment monitoring	"Treatments are well-monitored in relation to chronic medications and chronic illnesses, such as diabetes. Then there is a regular contact with particular physician." *[representative from the university, P42]*	It is really a challenge at the moment that the medication lists are not updated... And I think it is especially difficult when patient has multiple medications in use…When you have a lot of medicines which have all been prescribed in different places and by different physician, it seems that there is sometimes no one with the overall idea of the drug load. *[representative from the pharmacy, P21]* "Treatment monitoring, and especially the identification of potential adverse drug reactions, is perhaps the most challenging part in the medication use process. People do not know when to contact healthcare. It is also unclear how well they [ADR's] are recognised in healthcare. That's the challenge." *[representative from the patient organisation, P71]*
Patient level *(micro)*		
Patient	"Patients with chronic illnesses know a lot about their condition and medications. They also seek information. I'm not worried about the information sources that they use. Certainly, most of them use reliable sources." *[representative from the university, P78]*	"Patients do not even want to know [about the medicines they use]. This is something that healthcare professionals should recognise. They do not really remember all things that they have been told, and there is not even enough time for medication counselling during the visit with physician. In particular, when they receive a new diagnosis, they can concentrate only on that, and it is fair enough if they remember to take their pill every day, that's enough." *[representative from the scientific society, P29]* "It is really difficult to ask questions [from the physician] as patients may not know what to ask. And on the other hand, patients may be afraid that they will ask naive questions..." *[representative from the university, P76]*

Reporting checklist for qualitative study.

Based on the SRQR guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the SRQRreporting guidelines, and cite them as:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. Acad Med. 2014;89(9):1245-1251.

		Reporting Item	Page Number
Title			
	#1	Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g. ethnography, grounded theory) or data collection methods (e.g. interview, focus group) is recommended	1

Abstract			
	#2	Summary of the key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results and conclusions	2
Introduction			
Problem formulation	#3	Description and signifcance of the problem / phenomenon studied: review of relevant theory and empirical work; problem statement	4
Purpose or research question	#4	Purpose of the study and specific objectives or questions	5
Methods			
Qualitative approach and research paradigm	#5	Qualitative approach (e.g. ethnography, grounded theory, case study, phenomenolgy, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g. postpositivist, constructivist / interpretivist) is also recommended; rationale. The rationale should briefly discuss the justification for choosing that theory, approach, method or technique rather than other options available; the assumptions and limitations implicit in those choices and how those choices influence study conclusions and transferability. As appropriate the	6,7

		rationale for several items might be discussed together.	
Researcher characteristics and reflexivity	#6	Researchers' characteristics that may influence the research, including personal attributes, qualifications / experience, relationship with participants, assumptions and / or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results and / or transferability	7
Context	#7	Setting / site and salient contextual factors; rationale	5,6
Sampling strategy	#8	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g. sampling saturation); rationale	5,6
Ethical issues pertaining to human subjects	#9	Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	8
Data collection methods	#10	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources / methods, and modification of procedures in response to evolving study findings; rationale	7,Fig.2

Data collection instruments and technologies	#11	Description of instruments (e.g. interview guides, questionnaires) and devices (e.g. audio recorders) used for data collection; if / how the instruments(s) changed over the course of the study	6,7
Units of study	#12	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	8, Table 1
Data processing	#13	Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and 4nonymization / deidentification of excerpts	7, Fig.2
Data analysis	#14	Process by which inferences, themes, etc. were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale	7, Fig.2
Techniques to enhance trustworthiness	#15	Techniques to enhance trustworthiness and credibility of data analysis (e.g. member checking, audit trail, triangulation); rationale	7
Results/findings			
Syntheses and interpretation	#16	Main findings (e.g. interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	8-11

Links to empirical data	#17	Evidence (e.g. quotes, field notes, text excerpts, photographs) to substantiate analytic findings	Appendix A
Discussion			
Intergration with prior work, implications, transferability and contribution(s) to the field	#18	Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application / generalizability; identification of unique contributions(s) to scholarship in a discipline or field	11-13
Limitations	#19	Trustworthiness and limitations of findings	13,14
Other			
Conflicts of interest	#20	Potential sources of influence of perceived influence on study conduct and conclusions; how these were managed	15
Funding	#21	Sources of funding and other support; role of funders in data collection, interpretation and reporting	15

None The SRQR checklist is distributed with permission of Wolters Kluwer © 2014 by the Association of American Medical Colleges. This checklist can be completed online using https://www.goodreports.org/, a tool made by the EQUATOR Network in collaboration with Penelope.ai

BMJ Open

How far are we from a medication use process aiming at well-informed adherent patients with long-term medications? A qualitative study

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2019-036526.R1
Article Type:	Original research
Date Submitted by the Author:	10-Mar-2020
Complete List of Authors:	Mononen, Niina; University of Helsinki, Faculty of Pharmacy, Division of Pharmacology and Pharmacotherapy Pohjanoksa-Mäntylä, Marika ; University of Helsinki Airaksinen, Marja; University of Helsinki Hämeen-Anttila, Katri; Finnish Medicines Agency FIMEA, Assessment of Pharmacotherapies
Primary Subject Heading:	Health policy
Secondary Subject Heading:	Health informatics, Qualitative research
Keywords:	Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Organisation of health services < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, PUBLIC HEALTH, QUALITATIVE RESEARCH, HEALTH SERVICES ADMINISTRATION & MANAGEMENT

Title	**How far are we from a medication use process aiming at well-informed adherent patients with long-term medications? A qualitative study**
Authors' names	Niina Mononen, Marika Pohjanoksa-Mäntylä, Marja Airaksinen, Katri Hämeen-Anttila
Address and position for each author	Niina Mononen, MSc (Pharm), PhD Student Marika Pohjanoksa-Mäntylä, PhD, University Lecturer Marja Airaksinen, Professor, PhD Clinical Pharmacy Group, Division of Pharmacology and Pharmacotherapy, Faculty of Pharmacy, University of Helsinki, 00014 University of Helsinki, Finland
	Katri Hämeen-Anttila, PhD, Research and Development Manager Assessment of Pharmacotherapies, Finnish Medicines Agency Fimea, P.O. Box 55, 00034 FIMEA, Finland
Corresponding author	Niina Mononen Clinical Pharmacy Group, Division of Pharmacology and Pharmacotherapy, Faculty of Pharmacy, University of Helsinki, 00014 University of Helsinki, Finland E-mail: niina.mononen@helsinki.fi Telephone: +358 (0) 2941 59917

Word count: 4045

Keywords: health policy, health services administration & management, organisation of health services, public health, qualitative research

ABSTRACT

Objective

Finland is one of the few countries that has established a national medicines information (MI) strategy. The ultimate goal of the Strategy is a well-implemented medication use process resulting in well-informed adherent patients. This study aimed at evaluating the implementation of the Strategy three years after its launch.

Design

The evaluation applied pragmatic approach and was conducted by interviewing stakeholders involved in The National Medicines Information Network enhancing the Strategy's implementation. The Network comprises national key stakeholders producing and using MI. Data were deductively and inductively content analysed by applying the Framework Method.

Setting

National implementation of the Strategy throughout the healthcare after the first operational period (2012–2014) in 2015.

Participants

Members of The National Medicines Information Network (n=79/111, participation rate 71%, representing 42/53 stakeholder organisations).

Outcome measures

A new conceptual framework was developed based on stakeholders' views on well-implemented actions and actions needing development in the medication use process at: 1) infrastructure (*macro*), 2) healthcare professionals (*meso*), and 3) patient (*micro*) level.

Results

Medication counselling by community pharmacists was the most effectively implemented part of the medication use process, followed by physician's actions while starting a new medication, and advice given by nurses. The major development needs concerned: 1) poor access to patient information and its transfer in healthcare, particularly the lack of reconciled medication lists and electronic health records (*macro*); 2) poor functioning medication use process in home care and social care units, such as nursing homes (*meso*); and 3) limited patient involvement in their care (*micro*).

Conclusions

Far more actions for development than well-established practices in the medication use process were identified. Considerable improvements were reported to be needed at the infrastructure level to support the rational use of medicines at the patient level when implementing the next steps of the National Medicines Information Strategy.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- A wide range of stakeholders provided their reflections of the achievement of the ultimate goal of the National Medicines Information Strategy three years after its launch.
- A majority of the stakeholder representatives were healthcare professionals, half of them being pharmacists which may have skewed the results.
- Absence of real patients with chronic illnesses and medications may distort results.
- The dynamics of the interviews may have been influenced by the fact that they were conducted as individual, pair or group interviews according to convenience of each stakeholder.
- In the conceptual model building, the breakdown of the data to macro, meso and micro levels assisted in constructing a holistic understanding of the medication use process and its development needs.

INTRODUCTION

Carrying out long-term medication is a collaborative process whereby the ultimate goal is well-informed patients who have capability, and motivation to, self-manage their medications. Team-based and patient-centered care emphasises the roles and tasks of each healthcare provider involved in the care process to ensure medication use in a high-quality, safe, effective, economical and rational manner.[1] Part of this collaborative team should be the patients themselves so that they can take responsibility for their own care and become empowered for self-management and self-care.[2] Although all healthcare professionals involved in the medication use process should have clearly determined responsibilities and tasks, there still exists ambiguity in this respect.[3-5] Among healthcare professionals there is uncertainty about their own roles and tasks, as well as those of other professionals.[6-8] If the roles and tasks are not agreed upon, it can lead to preventable risk situations, medication errors or omissions.[3,9-11] It can also lead to a preventable increase in the medication-related burden for patients and impair their lived experience with the medication,[12] e.g., through inadequate support from the social and health service system at different phases of a long-term journey with a chronic illness.[13,14]

Easy access to reliable and timely health and MI is an integral part of the successful medication use process for both healthcare providers and medicine users.[15-21] This is a strategic issue which has been recognised, e.g., by the European Commission.[16,22] Finland is one of the few countries that have actually established a long-term strategic development plan for enhancing coordination between national key stakeholders involved in producing and using MI.[17,23-25] In Finland, MI practices have been actively developed since the 1980s, especially in community pharmacies (Appendix A).[26-30] Patients have a statutory right to receive information about their medicines from their healthcare providers, physicians and pharmacists being mandated to counsel on safe and appropriate medicine use while prescribing and dispensing.[31,32] The current national medicines policy (2011–2020) priorities the development of MI practices, particularly to improve coordination between MI providers and to enhance the use of MI sources in patient care.[23] To implement these medicines policy actions, the Finnish Medicines Agency Fimea launched a National Medicines Information Strategy in 2012 with the ultimate goal of a well-implemented medication use process that will result in well-informed and adherent patients by 2020.[24,25] The special emphasis of the Strategy is on patients with long-term medications. The aim of this study was to evaluate the implementation of the Strategy after the first three-year operational period (2012–2014) in 2015.

METHODS

Key content of the Strategy

The National Medicines Information Strategy was established by Fimea which also coordinates its implementation.[24,25] The Strategy builds on the European Commission recommendations on MI to patients.[16] The situation in other EU countries was investigated by conducting an inventory of MI strategies in the EU countries in 2009.[33] As the UK was found to have most advanced and systematic MI practices within EU, their MI strategy "Better Information, Better Choices, Better Health" was analysed more in detail.[34,35] To understand MI practices in Finland, an inventory of the MI research conducted in Finland since 2000 was carried out to identify strengths and development needs in MI.[28,36] Also potential stakeholders to be involved in the Strategy's implementation were interviewed to identify their views on strategic core contents and proposals for actions.[25]

The ultimate goal of the Strategy was influenced by the Chronic Care Model,[37,38] which was quite extensively piloted in Finland in the beginning of the 2010s (i.e., at the time the Strategy was established) as a potential basis for a new social and health services system.[39] The Model puts the patient into the center and encourages creation of structures and processes that support self-management of chronic diseases. The Model is applicable to MI as there is a wealth evidence, both globally and from Finland, that patients do not receive adequate support to self-manage their medication,[21,40-44] and adherence to treatment is still an unresolved issue.[2,45-50]

Appendix B shows the modifications of the Chronic Care model used in the Strategy. A key process for patients with long-term medications is the medication use process illustrated in Appendix B. The medication use process covers activities for the need assessment for medication, selection of the medication and prescribing, dispensing, dosing and administration, patient motivation and counselling to support adherence and self-management, treatment follow-up and assessment of outcomes.[24] The patient-specific medication plan is an important part of the medication use process which facilitates implementation of the medication and communication on it between the patient and participating healthcare providers and organisations. This “patient at the center” model is also in line with the pharmaceutical care process introduced by the landmark article of Hepler and Strand in 1990.[51]

The Strategy has 6 main goals and 37 proposals for actions.[24] Its implementation is divided into three operational periods (years 2012–2014; 2015–2017; and 2018–2020). The Strategy aims 1) to influence the quality, availability and utilisation of MI targeted to consumers and healthcare professionals, 2) to enhance professionals’ MI training and competences, and 3) to focus MI research to guide strategy work. Four working groups and their coordination group, i.e., The National Medicines Information Network, form the primary resource for Strategy’s implementation (see Table 1).[24,25]

Study design and setting

The medicine use process with the patient at the center (Appendix B) was chosen as a target of the Strategy’s evaluation. The study applied pragmatic approach and the evaluation was based on reflections of the members of The National Medicines Information Network. A qualitative cross-sectional design with semi-structured interviews among the members of the Network was used. The interviews were performed after the first three-year operational period (2012–2014) of the Strategy in 2015. During that operational period, the Network had 111 members representing 53 stakeholder organisations. First, an invitation to participate in the interview was sent to all members of the network via email. A more detailed information letter was sent to those who agreed to participate in the study.

Interview guide

A semi-structured interview guide with two main themes and eight sub-themes focusing on the goals and actions of the National Medicines Information Strategy was developed.[24] The interview guide was pre-tested in two pilot interviews with six participants. No significant changes were made based on the pilot, and therefore, the data from the pilots were included in the study. The two main themes discussed in the interviews pertained to: 1) reaching the goals and implementing the actions of the Strategy, and 2) actions taken by The National Medicines Information Network. This study focused on the first main theme and the following questions in the interview guide: "If you consider the figure of medication use process for a patient with chronic diseases, then: 1) what are the most crucial actions that have been implemented, and 2) what actions should be focused upon in the future in order to achieve the goal of a well-informed, adherent patient or medicine user?" The figure of the medication use process as illustrated in the Strategy was shown to the participants to stimulate discussion during the interview (Appendix B).[24]

Data collection

Interviews were conducted as individual, pair and group interviews depending on the preference of each stakeholder in 2015. The aim was to have only one stakeholder organisation in each interview. Due to the geographical location and schedules of the participants, interviews were conducted face-to-face, by telephone or via video conferencing. One moderator NM (female pharmacist, MSc, with training in qualitative interviews) facilitated and audiotaped all interviews with permission from the participants.

Analysis

Data were analysed by applying the Framework Method that utilises both deductive and inductive content analysis (Fig. 1).[52] The analysis was carried out in stages using Microsoft Word and Excel (Windows 10 Home). The interviews were transcribed verbatim by a company specialised in converting to written text qualitative research data *(Stage 1)*. Each transcript was repeatedly read by one researcher (NM), while listening to the audiotapes *(Stage 2)*. Single words, sentences or groups of sentences related to study questions were coded by one researcher (NM) and verified by another researcher (MPM) *(Stage 3)*. Any differences of interpretation were discussed with the research group and consensus was received. Once the key categories were identified inductively, the transcripts were purposively read to detect any discussion that deviated from these categories and an analytical matrix was developed *(Stage 4)*. Main and sub-categories were primarily developed deductively according to the medication use process published previously in the National Medicines Information Strategy (Appendix B)[24] *(Stage 5)*. Additionally, new main and sub-categories were inductively derived from the interview data. Codes were classified into main categories, and the encoded data were charted into a spreadsheet generated from the analytical matrix *(Stage 6)*. Based on the existing medication use process model (Appendix B), and complemented with participants' views identified from the interviews, a new conceptual framework of the medication use process was developed *(Stage 7)*. The results are presented in accordance with two main research questions, i.e., stakeholders' views on: 1) the well-implemented actions, and 2) the actions needing development in the medication use process. The results are classified into three operational levels: infrastructure *(macro)*, healthcare professional *(meso)* and patient *(micro)* level. This follows the conceptual framework applied to combine the functions of primary care with the dimensions of integrated care.[53] Numbers of encodings were counted according to the mentions by each participant and the summative numbers were set into the operational levels. The standards for reporting qualitative research (SRQR) was utilised when applicable.[54]

Add figure 1 in here.

Ensuring rigor of the analysis

In the conceptual model building, breakdown of the data to *macro*, *meso* and *micro* levels was used.[53] *Trustworthiness* of the analysis process was confirmed in every phase, including data preparation (e.g., verbatim transcripts), management of data (e.g., software was used in data coding) and reporting of results (e.g., a single coder with a reviewer).[55,56] To ensure the *credibility*, a previously known model of a medication use process[24] was used as an analysis matrix, supplemented with the main and sub-categories identified inductively from the data. Additionally, a theoretical method used previously in healthcare research[52] was applied in analysing data to strengthen *credibility*. To increase the *comprehensivity* of the study, two researchers – and when necessary the whole research group – were involved in the data analysis process. The content and structure of concepts created by content analysis were illustrated with the examples of quotations from various participants to indicate *conformability* and *objectivity*. Quotations have been selected to represent the identified main and sub-categories in the new conceptual framework developed for the medication use process.

Research ethics

The study was conducted according to good scientific practice, following the guidelines of the Finnish Advisory Board on Research Integrity.[57] According to the guidelines, the study was deemed to be exempt from requiring approval from the research ethics committee. The research plan was approved by The National Medicines Information Network before starting the data collection. Prior to the interviews, participants were informed in writing about the study and that the interviews will be tape-recorded. At the beginning of each interview they were asked to give informed consent. Participation was voluntary with the opportunity to withdraw from the study at any time. The recordings and interview notes were digitally stored behind a password. All data were anonymised and were accessible only to the authors. Privacy and confidentiality of the individuals participating in the study were ensured throughout the entire research project.

Patient and public involvement

Patient participation was taken into account by interviewing representatives from various national patient organisations who were active partners in The National Medicines Information Network. There was no real patients or public involvement in the planning phase or design of the study. The results of the study will be discussed in the Network for further actions of the Strategy that will be extended to a new term lasting until 2026.

RESULTS

In total, 79 out of 111 members of The National Medicines Information Network participated in the study (participation rate 71%) representing 42 out of 53 stakeholders (Table 1). Females represented 77% (n=61) of participants. Interviews (n=43) were conducted as individual (n=22), pair (n=11) or group interviews (n=10), either face-to-face (79%, n=34), by telephone (12%, n=5), as video conferencing (7%, n=3) or as face-to-face and video conferencing (2%, n=1). Altogether, 3–6 participants attended the group interviews at a time. Four interviews included participants from more than one stakeholder organisations. A majority of the participants were pharmacists (43% of all participants, n=34), physicians (22%, n=17) and nurses (15%, n=12). Educational units were the most commonly represented stakeholder group (24% of the stakeholder organisations, n=10), including universities, polytechnics, vocational institutions and continuing education units.

Table 1 Characteristics of the individual stakeholder representatives (n=79) and the stakeholder organisations (n=42) participating in the study. (n=number of individual stakeholder representatives or stakeholder organisations)

Stakeholders by profession	**Individual stakeholder representatives who participated in the study**		**Individual stakeholder representatives in the Network[a]**	
	n	**%**	**n**	**%**
Pharmacists	34	43.0	41	36.9
Physicians	17	21.5	22	19.8
Nurses	12	15.2	15	13.5
Others	11	13.9	21	18.9
Practical nurses	2	2.5	2	1.8
Healthcare students	1[b]	1.3	4[b-e]	3.6
Dentists	0	0	1	0.9
Not known	2	2.5	5	4.5
Altogether	79		111	
Stakeholders by type of affiliation	**Stakeholder organisations that participated in the study**		**Stakeholder organisations represented in the Network[a]**	
	n	**%**	**n**	**%**
Healthcare centers, hospitals and hospital districts, hospital pharmacies and dispensaries, university pharmacies	8	19.0	8	15.1
Patient associations and organisations	8	19.0	10	18.9
Professional organisations	7[b,d,e]	16.7	8[b-e]	15.1
Universities	6[b,d,e]	14.3	6[b,d,e]	11.3
Scientific societies	4[b,d,f,g]	9.5	5[b,d,f,g]	9.4
Polytechnics, vocational institutions	3[e,h]	7.1	5[e,h]	9.4
National authorities	2	4.8	3	5.7
Organisations representing pharmaceutical industry	2	4.8	2	3.8
Continuing education units	1[b]	2.4	1[b]	1.9
Student associations	1[b]	2.4	4[b-e]	7.5
Others	0	0	1	1.9
Altogether	42		53	

[a]The National Medicines Information Network, [b]pharmacy, [c]dentistry, [d]medicine, [e]nursing, [f]clinical pharmacology, [g]psychiatry, [h]practical nursing.

Well-implemented actions in the medication use process

The new conceptual framework illustrating well-implemented actions in the medication use process consisted of ten main categories of actions (Fig. 2 and 3). Of these, seven were derived deductively from the previous medication use process model (Appendix B) and three were inductively derived from the data (Fig. 3). All the inductively derived categories were at the infrastructure *(macro)* level. Around half of the participants (52%) reported well-implemented actions, mostly at the meso level (i.e., healthcare professionals). Of these actions, medication counselling by community pharmacists was considered as the best implemented (n=26 mentions), followed by physicians' performance while starting a medication (n=14), and advice and guidance provided by nurses (n=14) (Appendix C).

Add figure 2 in here.

Add figure 3 in here.

Very few mentions of the well-implemented actions at the infrastructure *(macro)* level were present (Fig. 3). These related to the patient information transfer and electronic health records (EHRs) (n=4 mentions of being well-implemented) and multiprofessional collaboration (n=2), while none of the stakeholders mentioned management of the entire medication use process (n=0) or specialist services (n=0) as well-implemented.

Actions needing development in the medication use process

The stakeholders mentioned far more actions for development than well-established practices in the medication use process (211 vs. 68 mentions, respectively) (Fig. 2, 3 and 4). Almost all participants (94%) raised at least one area for improvement (Fig. 2 and 4, Appendix C). The highest number of mentions indicating a need for development concerned medication use process in home care and social care *(meso)* (n=34), patient information transfer and EHRs, including update medication lists *(macro)* (n=33), and patients' management with the medication *(micro)* (n=27). At the infrastructure *(macro)* level, management of the entire medication use process (n=24) and multiprofessional collaboration (n=23) were also frequently mentioned as areas for development.

Add figure 4 in here.

In the medication use process in home care and social care units, such as nursing homes, most of the concerns related to skills, competences and inadequate training of practical nurses to appropriately manage medications of their older clients (Fig. 4). A need for additional training in pharmacotherapy was raised, particularly for home care and nursing home staff to meet the requirements of their current work duties in geriatric care. Inadequate patient information transfer between care units and limited availability of EHRs in the medication use process were among the major concerns as not all professionals involved in the care team have access to complete and accurate patient information, such as laboratory results, or when the patient is transferred from a care unit to another. In addition, many stakeholders reported that the management of the entire medication use process needed development indicating fragmentation, lack of coordination and poor collaboration between different healthcare professionals and between professionals and patients. They also expressed concerns on treatment monitoring as it was not commonly conducted very systematically.

Finally, poor patient involvement during the entire medication use process was a concern reflecting a lack of motivation or adherence to treatment and an inability or unwillingness to communicate with healthcare professionals (Fig. 4). A further concern was that patients do not always have updated medication lists or treatment plans, which may not only challenge healthcare professionals at the point of prescribing and dispensing medicines, but also patients while using medicines at home. Additionally, patients' limited skills in searching reliable health and MI and insufficient medication counselling for particular patient groups, such as the deaf, people with vision impairment and using multiple medications, were identified as areas needing attention.

DISCUSSION

This study revealed that the medication use process of chronically ill patients using long-term medications requires development at every level of implementation. The major development needs in the infrastructure concern the coordination and management of care, transfer of patient information between care units, availability of a reconciled medication list, and local and national agreements on responsibilities of patients and professionals involved in the medication use process. The most urgent development needs at professional level focus on the entire medication use process in primary and social care, particularly in geriatric units where practical nurses' competences do not meet their actual work responsibilities. The current medication use process lacks genuine patient-centeredness, manifested by a lack of adherence, motivation and communication, and the inability of patients to retrieve information. Patients on long-term medications need to be better involved in implementing their treatment by improving empowerment and partnership, and by finding new ways to support self-management and treatment commitment.

According to the stakeholders, challenges in implementing the medication use process appear to be the greatest in primary care, especially in home care and social care units such as in nursing homes. This means social and healthcare units providing care for older adults in the poorest health conditions. The result may reflect that the Finnish population is aging rapidly and the care system has not been adequately prepared for the growing need, for example, to train care personnel in geriatric pharmacotherapy to safely manage the medications. This is particularly the case for practical nurses whose responsibility for medication management in geriatric care units has increased remarkably even though their pharmacotherapy training is limited. Practical nurses have 3-year vocational education that focuses on supportive and technical nursing, and, thus, they may not have adequate competence to take responsibility for medication. This finding is in line with previous studies showing that nursing personnel (e.g., practical nurses) working in home care and social welfare units may lack pharmacotherapy knowledge and skills also in providing MI.[28,58-61] The same trend and challenges have been found in other research and development programs in Finland and other countries.[58,59] The challenge of safe management of medications and polypharmacy of older adults have been prioritised globally in the ongoing WHO Global Patient Safety Program "Medication Without Harm".[62] Further research should focus on geriatric care units in primary and social care to better understand the systems-based root causes and contributing factors of actual and potential risks in the current medication use processes.

Despite the pharmaceutical policy initiatives and wide recognition internationally of the importance of patient empowerment and involvement in healthcare,[2,62] our study reflects that it might not actualise in the best possible way. It is worth remembering that a majority of the interviewees in this study were health professionals, even where they represented the voice of patients. Thus, the results are skewed to a professional opinion even in the patient perspective. Nevertheless, the results send a clear message that patients' involvement in their long-term medication should be significantly increased. To be successful, research and actions should focus on patient approach in the implementation of long-term medications. Only the patients themselves can describe the issues that matter to them affecting their motivation for treatment, success of self-management and empowerment. Future studies should focus on real patients to explore their perceptions and experiences.

In this study, the stakeholders reported that patients are not often willing to discuss about their medications and medication-related problems. This may reflect their preferences, or capacity for participation, or uncertainty about the responsibilities and tasks of patients' and different healthcare professionals in the medication use process. Communicative relationship between healthcare professionals and patients is an essential driver for patient involvement in the medication use process, and for motivation for self-management and empowerment with medication use, especially for those with long-term medications.[37,38,51,63-65] Healthcare professionals should encourage patients to share experiences and concerns about their treatment. They also need to ensure access to MI throughout the process. Although the number of MI sources available for patients has increased, people might not always receive MI from any sources.[16,17,22] In Finland, the proportion of patients who report not receiving information on medicines they use from any healthcare professional have more than doubled between 1999 and 2014.[21] Actions are needed to ensure equal access of MI for all patients and throughout the medication use process to support self-management and empowerment.

Infrastructural factors leading to poor access to patient and MI and poor adherence, such as lack of update medication lists and treatment plans, and lack of personal communication with care providers should be further investigated from a patient perspective.[13,66] Especially, an update medication list is essential for professionals and patients. For example, guidelines for patient-centered therapeutic counselling assume that the practitioner should review available patient information before the encounter and use the information gathered to determine what to discuss and agree on the treatment with the medicine user.[28,30,67]

Since this evaluation was conducted in 2015, shortcomings found in the infrastructure of the medication use process related to the coordination and availability of electronic health records have been recognised in the ongoing Rational Pharmacotherapy Action Plan 2022.[63] The Government Program[68,69] based action plan is intended to strengthen the actions at the infrastructure level which were minor in 2015. At the same time, it extends the scope of development towards the meta level, including health and medicines policy making that can facilitate infrastructural changes in the medication use process through information guidance, resource allocation and legislation.[70]

Strengths and limitations of this study

This pragmatic evaluation was carried out at an early stage of Strategy's implementation. The aim was to conduct an evaluation by interviewing in order to obtain more detailed information from the stakeholders than would have been obtained, for example, through a survey. The interviews covered the whole range of stakeholders actively involved in implementing the Strategy. They can be assumed to be informants with the best understanding of the topic of research. However, a majority of the stakeholder representatives were healthcare professionals, half of them being pharmacists which may have skewed the results. There was also an absence of real patients with chronic illnesses and medications which may distort results. The dynamics of the interviews may have been influenced by the fact that they were conducted as individual, pair or group interviews according to convenience of each stakeholder. The data from different types of interviews were combined and the relative power of the opinions was determined by counting the mentions for each action. The profession or stakeholder group was not specified during the analysis, as the aim was to obtain an overall understanding of the implementation of medication use process rather than to compare views between professions or stakeholders. Moreover, participants' demographics, except gender, were not collected. The figure of the medication use process (Appendix B) was an important tool in the interviews to keep the discussion focused on core issues. Furthermore, the figure was also utilised as a framework in the deductive analysis which was supplemented with inductive analysis of the interview data. Thus, the figure was the basis for conducting the study and it has a strong influence on the study findings.

Implications and future research

This has been an eye-opening study that has helped to understand the functionality and shortcomings of the entire medication use process. The theory-base, conceptual model and methodology applied in this study may be useful for future follow up evaluations, or evaluating medication use processes in other settings. Future research should focus on investigating root causes for poor patient involvement in their own care. To improve medication adherence, the medication use process should be developed on a patient-oriented basis. This requires more qualitative research that listens to the long-term patients' experiences and modifies the medication use process accordingly.

CONCLUSIONS

Weaknesses in the infrastructure of the medication use process reflecting on the transfer of patient information, poorly functioning medication use processes in primary care and limited participation of patients in their care are priority areas while implementing the next steps of the National Medicines Information Strategy. Many of the challenges identified in this evaluation have been taken into consideration in the Strategy's implementation since 2015, the major challenges also in the Rational Pharmacotherapy Action Plan 2018–2022 by the Ministry of Social Affairs and Health.

Acknowledgements The authors gratefully acknowledge the members of The National Medicines Information Network who participated in this study. The authors acknowledge the Elli Turunen Fund of the Finnish Cultural Foundation for providing funding. The authors warmly thank Perihan Ipek for assistance in collecting the data, and AMNielsen ApS and Chelsea Schneider for proofreading the manuscript.

Contributors NM, MA, MP-M and KH-A have been involved in designing the study, developing the interview guide, planning the analysis and reporting this particular study. NM performed the interviews and data analysis. MP-M verified the codings of the data. MA, MP-M and KH-A contributed in the interpretation of the data. NM prepared the initial draft of the manuscript. MA, MP-M and KH-A critically reviewed and revised the manuscript. All authors read and gave the final approval of the version to be published.

Funding This research was supported by the Elli Turunen Fund of the Finnish Cultural Foundation. The sponsors had no role in design and conduct of the study; collection, management, analysis, and interpretation of the data; or in preparation, review, or approval of the manuscript.

Competing interests None declared.

Patient consent for publication Not required.

Data availability statement No additional data available.

REFERENCES

1 World Health Organization. Innovative care for chronic conditions: Building blocks for actions. Global report. World Health Organization, 2002. www.who.int/chp/knowledge/publications/icccreport/en/ (Accessed 10 Dec 2019).

2 World Health Organization. Adherence to long-term therapies: Evidence for action. World Health Organization, 2003. www.who.int/chp/knowledge/publications/adherence_report/en/ (Accessed 10 Dec 2019).

3 Celio J, Ninane F, Bugnon O, Schneider MP. Pharmacist-nurse collaborations in medication adherence-enhancing interventions: A review. *Patient Educ Couns* 2018;101:1175–92.

4 Olsen CF, Bergland A, Debesay J, Bye A, Langaas AG. Striking a balance: Health care providers' experiences with home-based, patient-centered care for older people – A meta-synthesis of qualitative studies. *Patient Educ Couns* 2019;102:1991–2000.

5 Toivo T, Dimitrow M, Puustinen J, et al. Coordinating resources for prospective medication risk management of older home care clients in primary care: Procedure development and RCT study design for demonstrating its effectiveness. *BMC Geriatr* 2018;18:74.

6 Elvey R, Hassell K, Hall J. Who do you think you are? Pharmacists' perceptions of their professional identity. *Int J Pharm Pract* 2013;21:322–32.

7 Kusi-Appiah E, Dahlke S, Stahlke S. Nursing care providers' perceptions on their role contributions in patient care: An integrative review. *J Clin Nurs* 2018;27:3830–45.

8 Lawrence RA, McLoone JK, Wakefield CE, Cohn RJ. Primary care physicians' perspectives of their role in cancer care: A systematic review. *J Gen Intern Med* 2016;31:1222–36.

9 Berland A, Bentsen SB. Medication errors in home care: A qualitative focus group study. *J Clin Nurs* 2017;26:3734–41.

10 Teinilä T, Kaunisvesi K, Airaksinen M. Primary care physicians' perceptions of medication errors and error prevention in cooperation with community pharmacists. *Res Social Adm Pharm* 2011;7:162–79.

11 van Sluisveld N, Zegers M, Natsch S, Wollersheim H. Medication reconciliation at hospital admission and discharge: Insufficient knowledge, unclear task reallocation and lack of collaboration as major barriers to medication safety. *BMC Health Serv Res* 2012;12:170.

12 Mohammed AM, Moles RJ, Chen TF. Medication-related burden and patients' lived experience with medicine: A systematic review and metasynthesis of qualitative studies. *BMJ Open* 2016;6:e010035.

13 Kekäle M. Chronic myeloid leukemia patients' adherence to tyrosine kinase inhibitors in Finland: A journey of eighty-six patients [dissertation]. University of Helsinki, 2016. http://urn.fi/URN:ISBN:978-951-51-2353-4.

14 Puspitasari HP, Aslani P, Krass I. Pharmacists' and cosumers' viewpoints on counselling on prescription medicines in Australian community pharmacies. *Int J Pharm Pract* 2010;18:202–8.

15 Chisholm-Burns MA, Lee JK, Spivey CA, et al. US pharmacists' effect as team members on patient care: Systematic review and meta-analyses. *Med Care* 2010;48:923–33.

16 European Commission. High Level Pharmaceutical Forum 2005-2008: Conclusions and recommendations. European Communities, 2008. https://publications.europa.eu/en/publication-detail/-/publication/4fddf639-47cc-4f90-9964-142757d2515a (Accessed 10 Dec 2019).

17 International Pharmaceutical Federation. Medicines information: strategic development. The Hague: International Pharmaceutical Federation, 2017. www.fip.org/www/streamfile.php?filename=fip/publications/2017-01-Medicines-information-strategic-development.pdf (Accessed 10 Dec 2019).

18 Ryan R, Santesso N, Lowe D, et al. Interventions to improve safe and effective medicines use by consumers: An overview of systematic reviews. *Cochrane Database Syst Rev* 2014;CD007768.

19 Van Camp YP, Van Rompaey B, Elseviers MM. Nurse-led interventions to enhance adherence to chronic medication: Systematic review and meta-analysis of randomised controlled trials. *Eur J Clin Pharmacol* 2013;69:761–70.

20 Zolnierek KBH, DiMatteo MR. Physician communication and patient adherence to treatment: A meta-analysis. *Med Care* 2009;47:826–34.

21 Mononen N, Airaksinen MSA, Hämeen-Anttila K, Helakorpi S, Pohjanoksa-Mäntylä M. Trends in the receipt of medicines information among Finnish adults in 1999–2014: A nationwide repeated cross-sectional survey. *BMJ Open* 2019;9:e026377.

22 European Commission. High Level Group on innovation and provision of medicines in the European Union: Recommendations for action. G10 Medicines report. European Communities, 2002. http://ec.europa.eu/health/ph_overview/Documents/key08_en.pdf (Accessed 10 Dec 2019).

23 Ministry of Social Affairs and Health. Medicines Policy 2020: Towards efficient, safe, rational and cost effective use of medicines. Publications of the Ministry of Social Affairs and Health, 2011. http://urn.fi/URN:ISBN:978-952-00-3165-7 (Accessed 10 Dec 2019).

24 Finnish Medicines Agency Fimea. Rational use of medicines through information and guidance – Medicines information services: Current state and strategy for 2020. Serial Publication Fimea Develops, Assesses and Informs, 2012. http://urn.fi/URN:ISBN:978-952-5624-21-2 (Accessed 10 Dec 2019).

25 Hämeen-Anttila K, Luhtanen S, Airaksinen M, Pohjanoksa-Mäntylä M. Developing a national medicines information strategy in Finland – A stakeholders' perspective on the strengths, challenges and opportunities in medicines information. *Health Policy* 2013;111:200–5.

26 Airaksinen M, Ahonen R, Enlund H. The questions to ask about your medicines campaign – An evaluation of pharmacists and the public’s response. *Med Care* 1998;36:422–7.

27 Kansanaho H. Implementation of the principles of patient counselling into practice in Finnish community pharmacies [dissertation]. University of Helsinki, 2006. http://urn.fi/URN:ISBN:952-10-2877-7.
28 Mononen N, Järvinen R, Hämeen-Anttila K, et al. A national approach to medicines information research: A systematic review. *Res Social Adm Pharm* 2018;14:1106–24.

29 Pohjanoksa-Mäntylä M. Medicines information sources and services for consumers: A special focus on the Internet and people with depression [dissertation]. University of Helsinki, 2010. http://urn.fi/URN:ISBN:978-952-10-6128-8.

30 Puumalainen I. Development of instruments to measure the quality of patient counselling [dissertation]. University of Kuopio, 2005. http://urn.fi/URN:ISBN:951-27-0053-0.

31 Medicines Act (Finland) 395/1987. https://www.finlex.fi/fi/laki/ajantasa/1987/19870395 (Accessed 10 Dec 2019).

32 Decree on the prescription of medicines 1088/2010. https://www.finlex.fi/fi/laki/alkup/2010/20101088 (Accessed 10 Dec 2019).

33 Salonen I. National Medicines Information Strategy – Medicines related political actions in Finland and in the European Union in the 21st century to improve the quality and availability of the medicines information directed to the consumers [master’s thesis]. University of Helsinki, 2010. http://urn.fi/URN:NBN:fi-fe20180115196 (Accessed 7 Mar 2020).

34 Department of Health. Better information, better choices, better health – Putting information at the centre of health. London: Department of Health, 2004.

35 Young N. National strategies for health and medicines information in the European Union: Experiences in the UK and Finland. Report. University of Helsinki, 2010.

36 Järvinen R, Enlund H, Airaksinen M, Kleme J, Mononen N, Hämeen-Anttila K. Medicines information research in Finland – A report to support the activities of the Medicines Information Network. Serial Publication Fimea Develops, Assesses and Informs 7/2013. Finnish Medicines Agency, 2013. http://urn.fi/URN:ISBN:978-952-5624-37-3 (Accessed 7 Mar 2020).

37 Wagner E.H. Chronic disease management: What will it take to improve cafe for chronic illness? *Eff Clin Pract* 1998;1:2–4.

38 Wagner EH, Austin BT, Hindmarsh M, Schaefer J, Bonomi A. Improving chronic illness care: Translating evidence into action. *Health Aff (Millwood)* 2001;20:64–78.

39 Nikander J, Tuominen-Thuesen M. National development programme for social welfare and health care (KASTE 2010–2015) External evaluation – Final report. Reports and memorandums of the Ministry of Social Affairs and Health, 2016. http://urn.fi/URN:ISBN:978-952-00-3800-7 (Accessed 10 Dec 2019).

40 Bults M, Beaujean DJMA, Wijkmans CJ, Timen A, Richardus JH, Voeten HACM. Why did patients with cardiovascular disease in the Netherlands accept Q fever vaccination? *Vaccine* 2012;30:3369–75.

41 Hamrosi KK, Aslani P, Raynor DK. Beyond needs and expectations: Identifying the barriers and facilitators to written medicine information provision and use in Australia. *Health Expect* 2014;17:220–31.

42 Hamrosi KK, Raynor DK, Aslani P. Pharmacist, general practitioner and consumer use of written medicine information in Australia: Are they on the same page? *Res Social Adm Pharm* 2014;10:656–68.

43 Hämeen-Anttila K, Pietilä K, Pylkkänen L, Pohjanoksa-Mäntylä M. Internet as a source of medicines information (MI) among frequent internet users. Res Soc Adm Pharm 2018;14:758–764.

45 Armitage LC, Kassavou A, Sutton S. Do mobile device apps designed to support medication adherence demonstrate efficacy? A systematic review of randomised controlled trials, with meta-analysis. *BMJ Open* 2020;10:e032045.

46 Baumgartner PC, Haynes RB, Hersberger KE, Arnet I. A systematic review of medication adherence thresholds dependent of clinical outcomes. *Front Pharmacol* 2018;9:1290.

47 Conn VS, Ruppar TM, Enriquez M, Cooper P. Medication adherence interventions that target subjects with adherence problems: Systematic review and meta-analysis. *Res Social Adm Pharm* 2016;12:218–46.

48 Conn VS, Ruppar TM, Enriquez M, Cooper PS. Patient-centered outcomes of medication adherence interventions: Systematic review and meta-analysis. *Value Health* 2016;19:277–85.

49 Costa E, Giardini A, Savin M, et al. Interventional tools to improve medication adherence: Review of literature. *Patient Prefer Adherence* 2015;9:1303–14.

50 Torres-Robles A, Wiecek E, Tonin FS, Benrimoj SI, Fernandez-Llimos F, Garcia-CardenasV. Comparison of interventions to improve long-term medication adherence across different clinical conditions: A systematic review with network meta-analysis. *Front Pharmacol* 2018;9:1454.

51 Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. *Am J Hosp Pharm* 1990;7:533–43.

52 Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Med Res Methodol* 2013;13:117.

53 Valentijn PP, Schepman SM. Understanding integrated care: A comprehensive conceptual framework based on the integrative functions on primary care. *Int J Integr Care* 2013;13:e010.

54 O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med* 2014;89:1245–51.

55 Elo S, Kääriäinen M, Kanste O, Pölkki T, Utriainen K, Kyngäs H. Qualitative content analysis: A focus on trustworthiness. *SAGE Open* 2014;4.

56 Raskind IG, Shelton RC, Comeau DL, Cooper HLF, Griffith DM, Kegler MC. A review of qualitative data analysis practices in health education and health behavior research. *Health Educ Behav* 2019; 46:32-39.

57 Finnish National Board on Research Integrity TENK. The ethical principles of research with human participants and ethical review in the human sciences in Finland. www.tenk.fi/sites/tenk.fi/files/Ihmistieteiden_eettisen_ennakkoarvioinnin_ohje_2019.pdf (Accessed 10 Dec 2019).

58 Kallio S, Kumpusalo-Vauhkonen A, Järvensivu T, Mäntylä A, Pohjanoksa-Mäntylä M, Airaksinen M. Towards interprofessional networking in medication management of the aged: Current challenges and potential solutions in Finland. *Scand J Prim Health Care* 2016;34:368–76.

59 Sawan M, Jeon YH, Chen TF. Relationship between organizational culture and the use of psychotropic medicines in nursing homes: A systematic integrative review. *Drugs Aging* 2018;35:189–211.

60 Sneck S, Saarnio R, Isola A, Boigu R. Medication competency of nurses according to theoretical and drug calculation online exams: A descriptive correlational study. *Nurse Educ Today* 2016;36:195–201.

61 Sulosaari V, Huupponen R, Torniainen K, Hupli M, Puukka P, Leino-Kilpi H. Medication education in nursing programmes in Finland - Findings from a national survey. *Collegian* 2014;21:327–35.

62 World Health Organization. Medication without harm: Global patient safety challenge on medication safety. World Health Organization, 2017. www.who.int/patientsafety/medication-safety/medication-without-harm-brochure/en/ (Accessed 10 Dec 2019).

63 Hämeen-Anttila K, Närhi U, Tahvanainen H. Rational Pharmacotherapy action plan – Final report. Reports and memorandums of the Ministry of Social Affairs and Health, 2018. http://urn.fi/URN:ISBN:978-952-00-3930-1 (Accessed 10 Dec 2019).

64 National Institute for Health and Care Excellence NICE. Medicines optimisation: the safe and effective use of medicines to enable the best possible outcomes. National Institute for Health and Care Excellence NICE, 2015. https://www.nice.org.uk/guidance/ng5 (Accessed 10 Mar 2020).

65 World Health Organization. Health 2020: A European policy framework and strategy for the 21st century. World Health Organization, 2013. http://www.euro.who.int/__data/assets/pdf_file/0011/199532/Health2020-Long.pdf?ua=1 (Accessed 10 Mar 2020).

66 Airaksinen M, Hämeen-Anttila K, Saastamoinen L. Effective use of research data: Research strategy for rational pharmacotherapy 2018–2022. Reports and memorandums of the Ministry of Social Affairs and Health, 2018. http://urn fi/URN:ISBN:978-952-00-3905-9 (Accessed 10 Dec 2019).

67 United States Pharmacopeia. Medication counselling behavior guidelines. United States Pharmacopeia, 1997.

68 Prime Minister's Office. Finland, a land of solutions – Strategic programme of Prime Minister Juha Sipilä's Government 29 May 2015. Government Publications, 2015. https://vnk.fi/documents/10184/1427398/Ratkaisujen+Suomi_EN_YHDISTETTY_netti.pdf/8d2e1a66-e24a-4073-8303-ee3127fbfcac/Ratkaisujen+Suomi_EN_YHDISTETTY_netti.pdf (Accessed 10 Dec 2019).

69 Finnish Government. Programme of Prime Minister Antti Rinne's Government 6 June 2019: inclusive and competent Finland – A socially, economically and ecologically sustainable society. Publications of the Finnish Government, 2019. http://urn.fi/URN:ISBN:978-952-287-760-4 (Accessed 10 Dec 2019).

70 Guler S, Hurton, S, winn MC, Molinari M. Levels in decision making and techniques for clinicians. *International Journal of Digestive Diseases* 2015;1.

LEGENDS OF THE FIGURES

Fig. 1 Content analysis process applying the Framework Method.[46]

Fig. 2 Categories of themes derived deductively (marked as blue) and inductively (marked as green) from the stakeholders' interviews (n=42, involving 79 interviewees) on well-implemented actions and actions needing development in medication use process for patients with chronic illnesses. (n=a summative of number of the single interviewee's mentions)

Fig. 3 Stakeholders' views on well-implemented actions in medication use process for patients with chronic illnesses. Categories derived deductively are marked as blue (n=7) and categories emerged inductively from the stakeholders' interviews are marked as green (n=3). (n=a summative of number of the single interviewee's mentions, HCP=healthcare professional)

Fig. 4 Stakeholders' views on actions needing development in medication use process for patients with chronic illnesses. Categories derived deductively are marked as blue (n=7) and categories emerged inductively from the stakeholders' interviews are marked as green (n=3). (n=a summative of number of the single interviewee's mentions, HCP=healthcare professional)

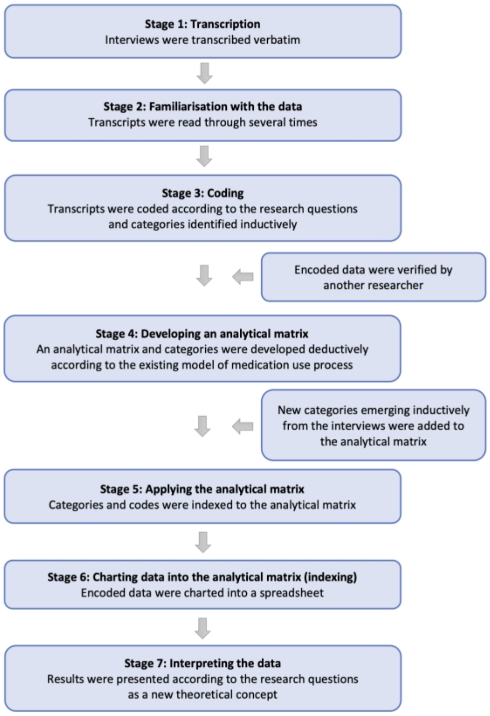


Fig. 1 Content analysis process applying the Framework Method.[46]

209x297mm (300 x 300 DPI)

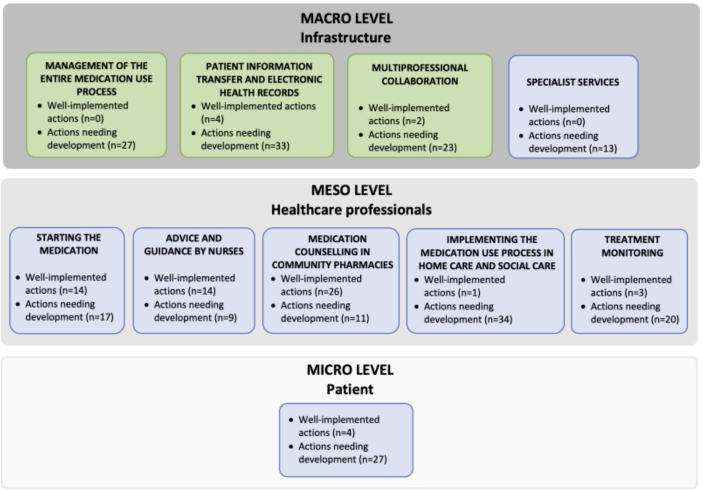
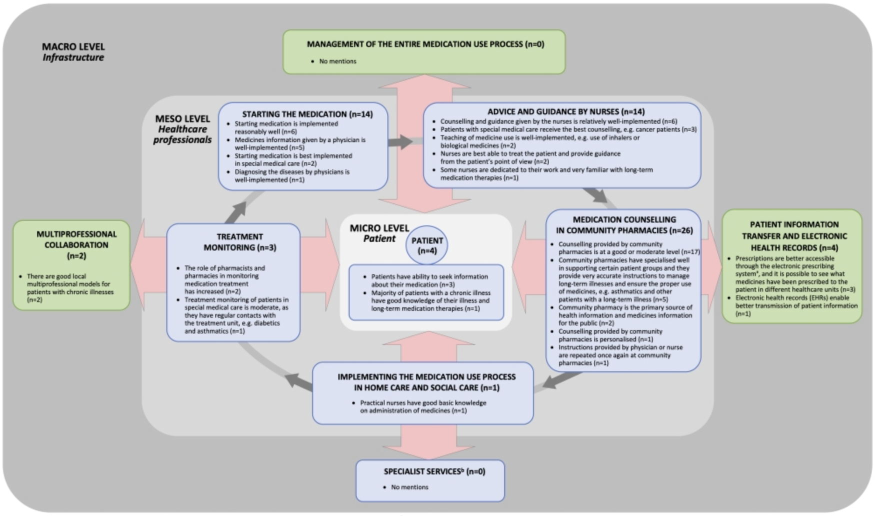


Fig. 2 Categories of themes derived deductively (marked as blue) and inductively (marked as green) from the stakeholders' interviews (n=42, involving 79 interviewees) on well-implemented actions and actions needing development in medication use process for patients with chronic illnesses. (n=a summative of number of the single interviewee's mentions)

209x297mm (300 x 300 DPI)



MANAGEMENT OF THE ENTIRE MEDICATION USE PROCESS (n=0)

- No mentions

STARTING THE MEDICATION (n=14)

- Starting medication is implemented reasonably well (n=6)
- Medicines information given by a physician is well-implemented (n=5)
- Starting medication is best implemented in special medical care (n=2)
- Diagnosing the diseases by physicians is well-implemented (n=1)

ADVICE AND GUIDANCE BY NURSES (n=14)

- Counselling and guidance given by the nurses is relatively well-implemented (n=6)
- Patients with special medical care receive the best counselling, e.g. cancer patients (n=3)
- Teaching of medicine use is well-implemented, e.g. use of inhalers or biological medicines (n=2)
- Nurses are best able to treat the patient and provide guidance from the patient's point of view (n=2)
- Some nurses are dedicated to their work and very familiar with long-term medication therapies (n=1)

MULTIPROFESSIONAL COLLABORATION (n=2)

- There are good local multiprofessional models for patients with chronic illnesses (n=2)

TREATMENT MONITORING (n=3)

- The role of pharmacists and pharmacies in monitoring medication treatment has increased (n=2)
- Treatment monitoring of patients in special medical care is moderate, as they have regular contacts with the treatment unit, e.g. diabetics and asthmatics (n=1)

PATIENT (n=4)

- Patients have ability to seek information about their medication (n=3)
- Majority of patients with a chronic illness have good knowledge of their illness and long-term medication therapies (n=1)

MEDICATION COUNSELLING IN COMMUNITY PHARMACIES (n=26)

- Counselling provided by community pharmacies is at a good or moderate level (n=17)
- Community pharmacies have specialised well in supporting certain patient groups and they provide very accurate instructions to manage long-term illnesses and ensure the proper use of medicines, e.g. asthmatics and other patients with a long-term illness (n=5)
- Community pharmacy is the primary source of health information and medicines information for the public (n=2)
- Counselling provided by community pharmacies is personalised (n=1)
- Instructions provided by physician or nurse are repeated once again at community pharmacies (n=1)

PATIENT INFORMATION TRANSFER AND ELECTRONIC HEALTH RECORDS (n=4)

- Prescriptions are better accessible through the electronic prescribing system[a], and it is possible to see what medicines have been prescribed to the patient in different healthcare units (n=3)
- Electronic health records (EHRs) enable better transmission of patient information (n=1)

IMPLEMENTING THE MEDICATION USE PROCESS IN HOME CARE AND SOCIAL CARE (n=1)

- Practical nurses have good basic knowledge on administration of medicines (n=1)

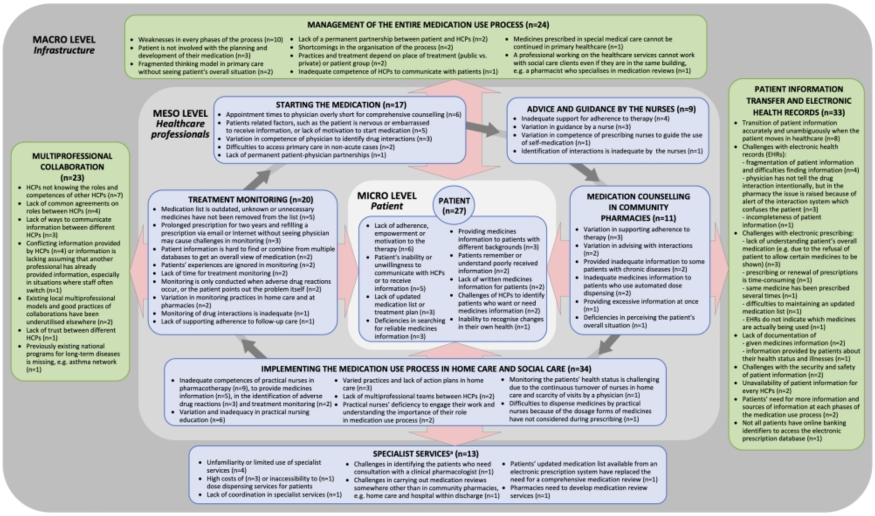
SPECIALIST SERVICES[b] (n=0)

- No mentions

[a]All prescriptions must be electronically prescribed from 1 January 2017, [b]e.g. clinical pharmacology consultation services and comprehensive medication reviews.

Fig. 3 Stakeholders' views on well-implemented actions in medication use process for patients with chronic illnesses. Categories derived deductively are marked as blue (n=7) and categories emerged inductively from the stakeholders' interviews are marked as green (n=3). (n=a summative of number of the single interviewee's mentions, HCP=healthcare professional)

297x209mm (300 x 300 DPI)



MACRO LEVEL *Infrastructure*

MANAGEMENT OF THE ENTIRE MEDICATION USE PROCESS (n=24)

- Weaknesses in every phases of the process (n=10)
- Patient is not involved with the planning and development of their medication (n=3)
- Fragmented thinking model in primary care without seeing patient's overall situation (n=2)
- Lack of a permanent partnership between patient and HCPs (n=2)
- Shortcomings in the organisation of the process (n=2)
- Practices and treatment depend on place of treatment (public vs. private) or patient group (n=2)
- Inadequate competence of HCPs to communicate with patients (n=1)
- Medicines prescribed in special medical care cannot be continued in primary healthcare (n=1)
- A professional working on the healthcare services cannot work with social care clients even if they are in the same building, e.g. a pharmacist who specialises in medication reviews (n=1)

MESO LEVEL *Healthcare professionals*

STARTING THE MEDICATION (n=17)

- Appointment times to physician overly short for comprehensive counselling (n=6)
- Patients related factors, such as the patient is nervous or embarrassed to receive information, or lack of motivation to start medication (n=5)
- Variation in competence of physician to identify drug interactions (n=3)
- Difficulties to access primary care in non-acute cases (n=2)
- Lack of permanent patient-physician partnerships (n=1)

ADVICE AND GUIDANCE BY THE NURSES (n=9)

- Inadequate support for adherence to therapy (n=4)
- Variation in guidance by a nurse (n=3)
- Variation in competence of prescribing nurses to guide the use of self-medication (n=1)
- Identification of interactions is inadequate by the nurses (n=1)

MULTIPROFESSIONAL COLLABORATION (n=23)

- HCPs not knowing the roles and competences of other HCPs (n=7)
- Lack of common agreements on roles between HCPs (n=4)
- Lack of ways to communicate information between different HCPs (n=3)
- Conflicting information provided by HCPs (n=4) or information is lacking assuming that another professional has already provided information, especially in situations where staff often switch (n=1)
- Existing local multiprofessional models and good practices of collaborations have been underutilised elsewhere (n=2)
- Lack of trust between different HCPs (n=1)
- Previously existing national programs for long-term diseases is missing, e.g. asthma network (n=1)

TREATMENT MONITORING (n=20)

- Medication list is outdated, unknown or unnecessary medicines have not been removed from the list (n=5)
- Prolonged prescription for two years and refilling a prescription via email or Internet without seeing physician may cause challenges in monitoring (n=3)
- Patient information is hard to find or combine from multiple databases to get an overall view of medication (n=2)
- Patients' experiences are ignored in monitoring (n=2)
- Lack of time for treatment monitoring (n=2)
- Monitoring is only conducted when adverse drug reactions occur, or the patient points out the problem itself (n=2)
- Variation in monitoring practices in home care and at pharmacies (n=2)
- Monitoring of drug interactions is inadequate (n=1)
- Lack of supporting adherence to follow-up care (n=1)

MICRO LEVEL *Patient*

PATIENT (n=27)

- Lack of adherence, empowerment or motivation to the therapy (n=6)
- Patient's inability or unwillingness to communicate with HCPs or to receive information (n=5)
- Lack of updated medication list or treatment plan (n=3)
- Deficiencies in searching for reliable medicines information (n=3)
- Providing medicines information to patients with different backgrounds (n=3)
- Patients remember or understand poorly received information (n=2)
- Lack of written medicines information for patients (n=2)
- Challenges of HCPs to identify patients who want or need medicines information (n=2)
- Inability to recognise changes in their own health (n=1)

MEDICATION COUNSELLING IN COMMUNITY PHARMACIES (n=11)

- Variation in supporting adherence to therapy (n=3)
- Variation in advising with interactions (n=2)
- Provided inadequate information to some patients with chronic diseases (n=2)
- Inadequate medicines information to patients who use automated dose dispensing (n=2)
- Providing excessive information at once (n=1)
- Deficiencies in perceiving the patient's overall situation (n=1)

PATIENT INFORMATION TRANSFER AND ELECTRONIC HEALTH RECORDS (n=33)

- Transition of patient information accurately and unambiguously when the patient moves in healthcare (n=8)
- Challenges with electronic health records (EHRs):
  - fragmentation of patient information and difficulties finding information (n=4)
  - physician has not tell the drug interaction intentionally, but in the pharmacy the issue is raised because of alert of the interaction system which confuses the patient (n=3)
  - incompleteness of patient information (n=1)
- Challenges with electronic prescribing:
  - lack of understanding patient's overall medication (e.g. due to the refusal of patient to allow certain medicines to be shown) (n=3)
  - prescribing or renewal of prescriptions is time-consuming (n=1)
  - same medicine has been prescribed several times (n=1)
  - difficulties to maintaining an updated medication list (n=1)
  - EHRs do not indicate which medicines are actually being used (n=1)
- Lack of documentation of
  - given medicines information (n=2)
  - information provided by patients about their health status and illnesses (n=1)
- Challenges with the security and safety of patient information (n=2)
- Unavailability of patient information for every HCPs (n=2)
- Patients' need for more information and sources of information at each phases of the medication use process (n=2)
- Not all patients have online banking identifiers to access the electronic prescription database (n=1)

IMPLEMENTING THE MEDICATION USE PROCESS IN HOME CARE AND SOCIAL CARE (n=34)

- Inadequate competences of practical nurses in pharmacotherapy (n=9), to provide medicines information (n=5), in the identification of adverse drug reactions (n=3) and treatment monitoring (n=2)
- Variation and inadequacy in practical nursing education (n=6)
- Varied practices and lack of action plans in home care (n=3)
- Lack of multiprofessional teams between HCPs (n=2)
- Practical nurses' deficiency to engage their work and understanding the importance of their role in medication use process (n=2)
- Monitoring the patients' health status is challenging due to the continuous turnover of nurses in home care and scarcity of visits by a physician (n=1)
- Difficulties to dispense medicines by practical nurses because of the dosage forms of medicines have not considered during prescribing (n=1)

SPECIALIST SERVICES[a] (n=13)

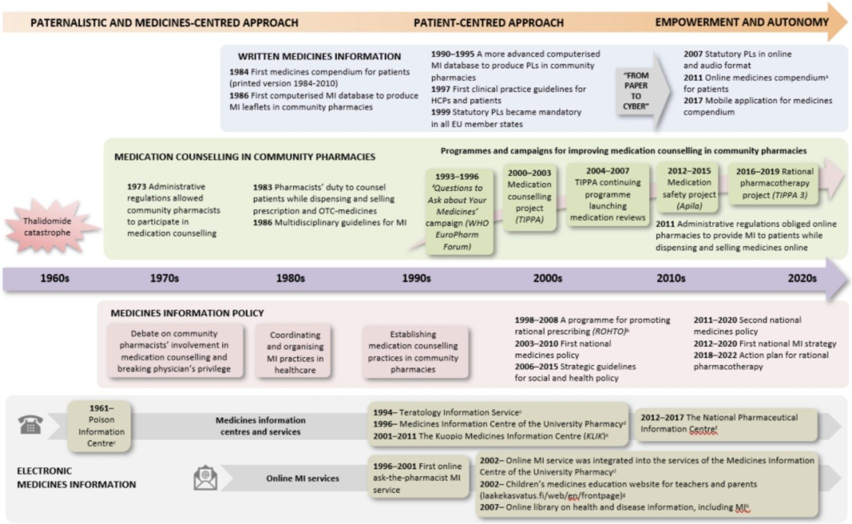
- Unfamiliarity or limited use of specialist services (n=4)
- High costs of (n=3) or inaccessibility to (n=1) dose dispensing services for patients
- Lack of coordination in specialist services (n=1)
- Challenges in identifying the patients who need consultation with a clinical pharmacologist (n=1)
- Challenges in carrying out medication reviews somewhere other than in community pharmacies, e.g. home care and hospital within discharge (n=1)
- Patients' updated medication list available from an electronic prescription system have replaced the need for a comprehensive medication review (n=1)
- Pharmacies need to develop medication review services (n=1)

[a] e.g. clinical pharmacology consultation services and comprehensive medication reviews.

Fig. 4 Stakeholders' views on actions needing development in medication use process for patients with chronic illnesses. Categories derived deductively are marked as blue (n=7) and categories emerged inductively from the stakeholders' interviews are marked as green (n=3). (n=a summative of number of the single interviewee's mentions, HCP=healthcare professional)

297x209mm (300 x 300 DPI)

Appendix A. Evolution and milestones of medicines information to patients in Finland since the 1960s.



WRITTEN MEDICINES INFORMATION

1984 First medicines compendium for patients (printed version 1984-2010)
1986 First computerised MI database to produce MI leaflets in community pharmacies
1990–1995 A more advanced computerised MI database to produce PLs in community pharmacies
1997 First clinical practice guidelines for HCPs and patients
1999 Statutory PLs became mandatory in all EU member states
2007 Statutory PLs in online and audio format
2011 Online medicines compendium[a] for patients
2017 Mobile application for medicines compendium

MEDICATION COUNSELLING IN COMMUNITY PHARMACIES

1973 Administrative regulations allowed community pharmacists to participate in medication counselling
1983 Pharmacists' duty to counsel patients while dispensing and selling prescription and OTC-medicines
1986 Multidisciplinary guidelines for MI

Programmes and campaigns for improving medication counselling in community pharmacies

1993–1996 *'Questions to Ask about Your Medicines'* campaign *(WHO EuroPharm Forum)*
2000–2003 Medication counselling project *(TIPPA)*
2004–2007 TIPPA continuing programme launching medication reviews
2012–2015 Medication safety project *(Apila)*
2016–2019 Rational pharmacotherapy project *(TIPPA 3)*
2011 Administrative regulations obliged online pharmacies to provide MI to patients while dispensing and selling medicines online

MEDICINES INFORMATION POLICY

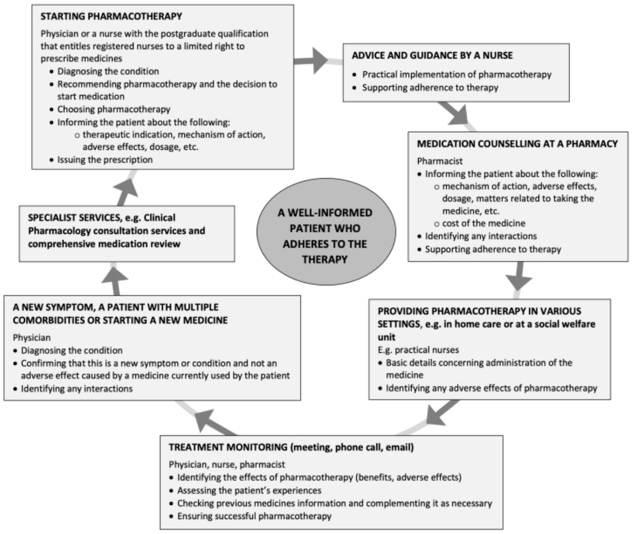
Debate on community pharmacists' involvement in medication counselling and breaking physician's privilege
Coordinating and organising MI practices in healthcare
Establishing medication counselling practices in community pharmacies
1998–2008 A programme for promoting rational prescribing *(ROHTO)*[b]
2003–2010 First national medicines policy
2006–2015 Strategic guidelines for social and health policy
2011–2020 Second national medicines policy
2012–2020 First national MI strategy
2018–2022 Action plan for rational pharmacotherapy

ELECTRONIC MEDICINES INFORMATION

1961– Poison Information Centre[c]
1994– Teratology Information Service[c]
1996– Medicines Information Centre of the University Pharmacy[d]
2001–2011 The Kuopio Medicines Information Centre (*KLIK*)[e]
2012–2017 The National Pharmaceutical Information Centre[f]
1996–2001 First online ask-the-pharmacist MI service
2002– Online MI service was integrated into the services of the Medicines Information Centre of the University Pharmacy[d]
2002– Children's medicines education website for teachers and parents (laakekasvatus.fi/web/en/frontpage)[g]
2007– Online library on health and disease information, including MI[h]

EU=European Union, HCP=healthcare professional, MI=medicines information, OTC=over-the-counter, PL=package leaflet. [a]Integrated into the online health library, [b]ROHTO initially worked as a project in 1998–2001, and after that it operated as the Centre for Pharmacotherapy Development ROHTO under the Ministry of Social Affairs and Health (2002–2008), [c]Service provided by the Hospital District of Helsinki and Uusimaa (HUS), [d]Service provided by the University Pharmacy which is owned by University of Helsinki, [e]Owned by the University of Kuopio/the University of Eastern Finland, [f]Owned by the University of Eastern Finland and Pharmaceutical Information Centre in 2012–2014, owned by Pharmaceutical Information Centre since 2015, and provided MI service to consumers until 2017, [g]Website portal owned by the University of Kuopio/the University of Eastern Finland during 2002–2011, since 2012 owned by the Finnish Medicines Agency Fimea, [h]Owned by the Finnish Medical Society Duodecim.

297x209mm (300 x 300 DPI)



Appendix B. Medicine use process for patients with chronic illnesses as illustrated in the National Medicines Information Strategy (© Fimea 2012).[24]

297x209mm (300 x 300 DPI)

Appendix C. Illustrative examples of the expressions (translated from Finnish) mentioned by the interviewees on the well-implemented actions and actions needing development in the medication use process categorised by main categories (n=10) emerged from the interviews. (P=participant of the study)

MAIN CATEGORIES	WELL-IMPLEMENTED ACTIONS	ACTIONS NEEDING DEVELOPMENT
Infrastructure level *(macro)*		
Management of the entire medication use process	No mentions.	“Well, it’s not an individual employee, but the entire medication use process should be better organised...” *[representative from the hospital, P72]* “And it also happens in primary healthcare, that they do identify a single illness or health problem but do not take account the person as a whole. This represents a fragmented way of thinking.” *[representative from the university, P42]*
Patient information transfer and electronic health records	"Electronic prescriptions have provided more clarity [to the medication use process]... via electronic prescription, with both nurses and physician providing patient care, for example for elderly people have a more comprehensive and updated view on patients’ medication than previously. It has been a great improvement...” *[representative from the university, P40]*	“Numerous investigations have identified problems, such as lack of critical patient information or incorrect information transfer, in the medication use process. It’s scary. In a way, it pulls the plug out of many things.” *[representative from the scientific society, P66]* “Well, I think we should pay attention to how medications are recorded in the electronic health records and how information is safely visible there. That’s catastrophic, that the same medicine may be listed there many times. But instead there is no information on when medication has been started or discontinued. [Medication] lists don’t update themselves, but someone needs to reconcile them.” *[representative from the healthcare center, P9]*
Multiprofessional collaboration	*“*Excellent local multiprofessional models for cooperation, particularly in long-term patient care, already exist.*”* *[representative form the national authority, P6]*	“Healthcare professionals should know better the tasks and responsibilities of each other, and, on the other hand, should also be familiar with each other’s knowledge, and what they can and cannot do.” *[representative from the university, P40]* “Do we know the skills of different health professionals [participating in the medication use process] well enough and how we could make optimal use of them. On the other hand, can we fully trust other professions.” *[representative from the professional organisation, P18]*
Specialist services	No mentions.	“Comprehensive medication reviews... big efforts should be made to make the reviews available to patients in need, so that they don’t have to pay for them themselves. This referral policy or some other way, such as the implementation of medication reviews at the pharmacies, is still unrealised. *[representative from the professional organisation, P23]*

Healthcare professionals level *(meso)*		
Starting the medication	“Starting the medication works rather well at the moment. It is always a physician who diagnoses a disease and counsels the patient how to manage their disease and treatment. Additionally, there is also a nurse commonly involved in counselling. Especially from the perspective of special care, this stage of the medication use process seems to work.” *[representative from the hospital districts, P73]* “Starting the medication, I think it works relatively well.” *[representative from the university, P69]*	“As a physician, I commonly prescribe medicines. While prescribing, there is often limited time for medication counselling. You just really manage to say that “here is your prescription and inform how patient should take her/his medication.” *[representative from the patient organisation, P71]* “Usually, patients are not very responsive to counselling, they may not remember what they have been told during the physician’s visit. *[representative from the professional organisation, P51]*
Advice and guidance by nurses	“I do have the belief that while the nurses and midwifes have limited prescribing rights, they also have a good knowledge on what to tell patients about medicines.” *[representative from the patient organisation, P56]* “And of course, In special medical care, patients will receive the best counselling on their medicines. This concerns for example cancer patients.” *[representative from community pharmacy, P64]*	“Advice and guidance given by a nurse varies greatly depending on the resources and indications.” *[representative from the patient organisation, P71]* ”Nurses should support their patients’ adherence.” *[representative from the professional organisation, P26]* “Nurses may not counsel patients much about drug-drug interactions, although it would be really crucial for all patients.” *[representative from the polytechnic, P74]*
Medication counselling in the community pharmacies	“The best knowledge about medicines is really in the community pharmacies.” *[representative from the professional organisation, P50]* “The process is best implemented in community pharmacies. There has been a systematic attempt to develop medication counselling for patients with certain diseases, such as asthma and other chronic diseases.” *[representative from the scientific society, P59]*	”Pharmacists should not give as much information about medicines as they currently do. It is probably because they wish to play safe and explain all the possible adverse drug reactions and all other things. It may result in decreased adherence.” *[representative from the university, P78]* “Supporting medication adherence, I do not know, maybe it is supported in some way, but I also think there occurs [among healthcare professionals] some paternalistic ways of thinking. They may consider that there is no need to tell everything. If the physician prescribes and counsels something, the patient should just take his or her medication and follow instructions.” *[representative from the university, P28]*

Implementing the medication use process in home care and social care	“I would believe and really hope that practical nurses have a good basic knowledge on the administration of medicines.” *[representative from the university, P76]*	“There is quite a lot of variation in nursing education as I understand it, because the aims of the education are formulated relatively loosely, and it depends on the local possibilities.” *[representative from the university, P40]* “This medication use process is as strong as its weakest and less educated link, which commonly is a practical nurse or assistant or even an entirely untrained person who medicates patients. It is not certain if they have updated information and knowledge. Either they may not have for example ability to identify adverse drug reactions.” *[representative from the patient association, P49]*
Treatment monitoring	“Treatments are well-monitored in relation to chronic medications and chronic illnesses, such as diabetes. Then there is a regular contact with particular physician.” *[representative from the university, P42]*	It is really a challenge at the moment that the medication lists are not updated... And I think it is especially difficult when patient has multiple medications in use…When you have a lot of medicines which have all been prescribed in different places and by different physician, it seems that there is sometimes no one with the overall idea of the drug load. *[representative from the pharmacy, P21]* “Treatment monitoring, and especially the identification of potential adverse drug reactions, is perhaps the most challenging part in the medication use process. People do not know when to contact healthcare. It is also unclear how well they [ADR’s] are recognised in healthcare. That’s the challenge.” *[representative from the patient organisation, P71]*
Patient level *(micro)*		
Patient	“Patients with chronic illnesses know a lot about their condition and medications. They also seek information. I’m not worried about the information sources that they use. Certainly, most of them use reliable sources.” *[representative from the university, P78]*	“Patients do not even want to know [about the medicines they use]. This is something that healthcare professionals should recognise. They do not really remember all things that they have been told, and there is not even enough time for medication counselling during the visit with physician. In particular, when they receive a new diagnosis, they can concentrate only on that, and it is fair enough if they remember to take their pill every day, that’s enough.” *[representative from the scientific society, P29]* ”It is really difficult to ask questions [from the physician] as patients may not know what to ask. And on the other hand, patients may be afraid that they will ask naive questions...” *[representative from the university, P76]*

Reporting checklist for qualitative study.

Based on the SRQR guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the SRQRreporting guidelines, and cite them as:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. Acad Med. 2014;89(9):1245-1251.

		Reporting Item	Page Number
Title			
	#1	Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g. ethnography, grounded theory) or data collection methods (e.g. interview, focus group) is recommended	1

Abstract

	#2	Summary of the key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results and conclusions	2

Introduction

Problem formulation	#3	Description and signifcance of the problem / phenomenon studied: review of relevant theory and empirical work; problem statement	4
Purpose or research question	#4	Purpose of the study and specific objectives or questions	5

Methods

Qualitative approach and research paradigm	#5	Qualitative approach (e.g. ethnography, grounded theory, case study, phenomenolgy, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g. postpositivist, constructivist / interpretivist) is also recommended; rationale. The rationale should briefly discuss the justification for choosing that theory, approach, method or technique rather than other options available; the assumptions and limitations implicit in those choices and how those choices influence study conclusions and transferability. As appropriate the	6,7

		rationale for several items might be discussed together.	
Researcher characteristics and reflexivity	#6	Researchers' characteristics that may influence the research, including personal attributes, qualifications / experience, relationship with participants, assumptions and / or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results and / or transferability	7
Context	#7	Setting / site and salient contextual factors; rationale	5,6
Sampling strategy	#8	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g. sampling saturation); rationale	5,6
Ethical issues pertaining to human subjects	#9	Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	8
Data collection methods	#10	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources / methods, and modification of procedures in response to evolving study findings; rationale	7,Fig.2

Data collection instruments and technologies	#11	Description of instruments (e.g. interview guides, questionnaires) and devices (e.g. audio recorders) used for data collection; if / how the instruments(s) changed over the course of the study	6,7
Units of study	#12	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	8, Table 1
Data processing	#13	Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and 4nonymization / deidentification of excerpts	7, Fig.2
Data analysis	#14	Process by which inferences, themes, etc. were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale	7, Fig.2
Techniques to enhance trustworthiness	#15	Techniques to enhance trustworthiness and credibility of data analysis (e.g. member checking, audit trail, triangulation); rationale	7
Results/findings			
Syntheses and interpretation	#16	Main findings (e.g. interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	8-11

Links to empirical data	#17	Evidence (e.g. quotes, field notes, text excerpts, photographs) to substantiate analytic findings	Appendix A
Discussion			
Intergration with prior work, implications, transferability and contribution(s) to the field	#18	Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application / generalizability; identification of unique contributions(s) to scholarship in a discipline or field	11-13
Limitations	#19	Trustworthiness and limitations of findings	13,14
Other			
Conflicts of interest	#20	Potential sources of influence of perceived influence on study conduct and conclusions; how these were managed	15
Funding	#21	Sources of funding and other support; role of funders in data collection, interpretation and reporting	15

None The SRQR checklist is distributed with permission of Wolters Kluwer © 2014 by the Association of American Medical Colleges. This checklist can be completed online using https://www.goodreports.org/, a tool made by the EQUATOR Network in collaboration with Penelope.ai

BMJ Open

How far are we from a medication use process aiming at well-informed adherent patients with long-term medications in Finland? A qualitative study

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2019-036526.R2
Article Type:	Original research
Date Submitted by the Author:	30-Mar-2020
Complete List of Authors:	Mononen, Niina; University of Helsinki, Faculty of Pharmacy, Division of Pharmacology and Pharmacotherapy Pohjanoksa-Mäntylä, Marika ; University of Helsinki Airaksinen, Marja; University of Helsinki Hämeen-Anttila, Katri; Finnish Medicines Agency FIMEA, Assessment of Pharmacotherapies
Primary Subject Heading:	Health policy
Secondary Subject Heading:	Health informatics, Qualitative research
Keywords:	Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Organisation of health services < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, PUBLIC HEALTH, QUALITATIVE RESEARCH, HEALTH SERVICES ADMINISTRATION & MANAGEMENT

Title	**How far are we from a medication use process aiming at well-informed adherent patients with long-term medications in Finland? A qualitative study**
Authors' names	Niina Mononen, Marika Pohjanoksa-Mäntylä, Marja Airaksinen, Katri Hämeen-Anttila
Address and position for each author	Niina Mononen, PhD, Postdoctoral Researcher Marika Pohjanoksa-Mäntylä, PhD, University Lecturer Marja Airaksinen, Professor, PhD Clinical Pharmacy Group, Division of Pharmacology and Pharmacotherapy, Faculty of Pharmacy, University of Helsinki, 00014 University of Helsinki, Finland
	Katri Hämeen-Anttila, PhD, Research and Development Manager Assessment of Pharmacotherapies, Finnish Medicines Agency Fimea, P.O. Box 55, 00034 FIMEA, Finland
Corresponding author	Niina Mononen Clinical Pharmacy Group, Division of Pharmacology and Pharmacotherapy, Faculty of Pharmacy, University of Helsinki, 00014 University of Helsinki, Finland E-mail: niina.mononen@helsinki.fi Telephone: +358 (0) 2941 59917

Word count: 4318

Keywords: health policy, health services administration & management, organisation of health services, public health, qualitative research

ABSTRACT

Objective

Finland is one of the few countries that has established a national medicines information (MI) Strategy. The ultimate goal of the Strategy is a well-implemented medication use process resulting in well-informed adherent patients. This study aimed at evaluating the implementation of the Strategy three years after its launch.

Design

The evaluation applied pragmatic approach and was conducted by interviewing stakeholders involved in the National MI Network enhancing the MI Strategy's implementation. The Network comprises national key stakeholders producing and using MI. Data were deductively analysed according to the medication use process of the MI Strategy using the Framework Method, complemented with inductively derived categories.

Setting

National implementation of the MI Strategy throughout the healthcare system after the first operational period (2012–2014) in 2015.

Participants

The members of the National MI Network (n=79/111, participation rate 71%, representing 42/53 stakeholder organisations).

Outcome measures

A new conceptual framework was developed based on stakeholders' views on well-implemented actions and actions needing development in the medication use process at: 1) infrastructure (*macro*), 2) healthcare professionals (*meso*), and 3) patient (*micro*) levels.

Results

Medication counselling by community pharmacists was the primary implemented action, followed by physicians' actions while starting a new medication, and advice given by nurses. The major development needs concerned: 1) poor access to patient information and its transfer in healthcare, particularly the lack of reconciled medication lists and electronic health records (*macro*); 2) poorly functioning medication use process in home care and social care units, such as nursing homes (*meso*); and 3) limited patient involvement in their care (*micro*).

Conclusions

Far more actions for development than well-established practices in the medication use process were identified. Major challenges found in this evaluation are considered in the ongoing Rational Pharmacotherapy Action Plan 2018–2022 by the Ministry of Social Affairs and Health.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- A wide range of stakeholders provided their reflections of the achievement of the ultimate goal of the national MI Strategy three years after its launch.
- A majority of the stakeholder representatives were healthcare professionals, half of them being pharmacists which may have skewed the results.
- Absence of real patients with chronic illnesses and medications may distort results.
- The dynamics of the interviews may have been influenced by the fact that they were conducted as individual, pair or group interviews according to convenience of each stakeholder.
- In the conceptual model building, the breakdown of the data to macro, meso and micro levels assisted in constructing a holistic understanding of the medication use process and its development needs.

INTRODUCTION

Carrying out long-term medication is a collaborative process whereby the ultimate goal is well-informed patients who have the capability, and motivation to, self-manage their medications. Team-based and patient-centred care emphasises the roles and tasks of each healthcare provider involved in the care process to ensure medication use in a high-quality, safe, effective, economical and rational manner.[1] Part of this collaborative team should be the patients themselves so that they can take responsibility for their own care and become empowered for self-management and self-care.[2] Although all healthcare professionals involved in the medication use process should have clearly determined responsibilities and tasks, there still exists ambiguity in this respect.[3-5] Among healthcare professionals there is uncertainty about their own roles and tasks, as well as those of other professionals.[6-8] If the roles and tasks are not agreed upon, it can lead to preventable risk situations, medication errors or omissions.[3,9-11] It can also lead to a preventable increase in the medication-related burden for patients and impair their lived experience with the medication,[12] e.g., through inadequate support from the social and health service system at different phases of a long-term journey with a chronic illness.[13,14]

Easy access to reliable and timely health and medicines information (MI) is an integral part of the successful medication use process for both healthcare providers and medicine users.[15-21] This is a strategic issue which has been recognised by, for instance, the European Commission.[16,22] Finland is one of the few countries that has actually established a long-term strategic development plan for enhancing coordination between national key stakeholders involved in producing and using MI.[17,23-25] In Finland, MI practices have been actively developed since the 1980s, especially in community pharmacies (Appendix A).[26-30] Patients have a statutory right to receive information about their medicines from their healthcare providers, with physicians and pharmacists being mandated to counsel on safe and appropriate medicine use while prescribing and dispensing.[31,32] The current national medicines policy (2011–2020) priorities the development of MI practices, particularly to improve coordination between MI providers and to enhance the use of MI sources in patient care.[23] To implement these medicines policy actions, the Finnish Medicines Agency Fimea launched a national MI Strategy “Rational Use of Medicines through Information and Guidance” in 2012 with the ultimate goal of a well-implemented medication use process that will result in well-informed and adherent patients by 2020.[24,25] The special emphasis of the MI Strategy is on patients with long-term medications. Although stakeholders play a key role in the implementation of MI strategies, the implementation has not previously been evaluated from their perspective.[17] The aim of this study was to evaluate the implementation of the MI Strategy in Finland from the stakeholders' perspective.

METHODS

Key content of the MI Strategy

The national MI Strategy was established by Fimea which also coordinates its implementation.[24,25] The MI Strategy builds on the European Commission recommendations on MI to patients.[16] The situation in other European Union (EU) countries was investigated by conducting an inventory of MI strategies in the EU countries in 2009.[33] As the UK was found to have the most advanced and systematic MI practices within EU, their MI Strategy "Better Information, Better Choices, Better Health" was analysed in greater detail.[34,35] To understand MI practices in Finland, an inventory of the MI research conducted in Finland since 2000 was carried out to identify strengths and development needs in MI.[28,36] In addition, potential stakeholders to be involved in the national MI Strategy's implementation were interviewed to identify their views on strategic core contents and proposals for actions.[25]

The ultimate goal of the national MI Strategy was influenced by the Chronic Care Model,[37,38] which was quite extensively piloted in Finland in the beginning of the 2010s (i.e. at the time the MI Strategy was established) as a potential basis for a new social and health services system.[39] The model puts the patient at the centre and encourages the creation of structures and processes that the support self-management of chronic diseases. The model is applicable to MI as there is a wealth of evidence, both globally and from Finland, that patients do not receive adequate support to self-manage their medication,[21,40-43] and adherence to treatment is still an unresolved issue.[2,44-49]

Appendix B shows the modifications of the Chronic Care model used in the national MI Strategy. A key process for patients with long-term medications is the medication use process illustrated in Appendix B. The medication use process covers activities for the needs assessment for medication, selection of the medication and prescribing, dispensing, dosing and administration, patient motivation and counselling to support adherence and self-management, treatment follow-up and assessment of outcomes.[24] The patient-specific medication plan is an important part of the medication use process which facilitates implementation of the medication and communication on it between the patient and participating healthcare providers and organisations. This “patient at the centre” model is also in line with the pharmaceutical care process introduced by the landmark article of Hepler and Strand in 1990.[50]

The national MI Strategy has 6 main goals and 37 proposals for actions.[24] Its implementation is divided into three operational periods (years 2012–2014; 2015–2017; and 2018–2020). The MI Strategy aims to 1) influence the quality, availability and utilisation of MI targeted to consumers and healthcare professionals, 2) enhance professionals’ MI training and competences, and 3) focus MI research to guide strategy work. Four working groups and their coordination group, i.e., National MI Network, form the primary resource for MI Strategy’s implementation (see Table 1).[24,25]

Study design and setting

The medicine use process with the patient at the centre (Appendix B) was chosen as a target of the national MI Strategy’s evaluation. The study applied a pragmatic approach and the evaluation was based on the reflections of the members of the National MI Network. A qualitative cross-sectional design with semi-structured interviews among the members of the MI Network was used. The interviews were performed after the first three-year operational period (2012–2014) of the national MI Strategy in 2015. During this operational period, the MI Network had 111 members representing 53 stakeholder organisations. First, an invitation to participate in the interview was sent to all members of the MI Network via email. Following this, a more detailed information letter was sent to those who agreed to participate in the study.

Interview guide

A semi-structured interview guide with two main themes and eight sub-themes focusing on the goals and actions of the national MI Strategy was developed.[24] The interview guide was pre-tested in two pilot interviews with six participants. No significant changes were made based on the pilot, and therefore, the data from the pilots were included in the study. The two main themes discussed in the interviews pertained to: 1) reaching the goals and implementing the actions of the MI Strategy, and 2) actions taken by the National MI Network. This study focused on the first main theme and the following questions in the interview guide: "If you consider the figure of medication use process for a patient with chronic diseases, then: 1) what are the most crucial actions that have been implemented, and 2) what actions should be focused upon in the future in order to achieve the goal of a well-informed, adherent patient or medicine user?" The figure of the medication use process as illustrated in the MI Strategy was shown to the participants to stimulate discussion during the interview (Appendix B).[24]

Data collection

Interviews were conducted as individual, pair and group interviews depending on the individual preference of each stakeholder in 2015. The aim was to have only one stakeholder organisation in each interview. Due to the geographical location and schedules of the participants, interviews were conducted face-to-face, by telephone or via video conferencing. One moderator NM (female pharmacist, MSc, with training in qualitative interviews) facilitated and audiotaped all interviews with permission from the participants.

Analysis

Data were analysed by applying the Framework Method, which utilises both deductive and inductive content analysis (Fig. 1).[51] The analysis was carried out in stages using Microsoft Word and Excel (Windows 10 Home). The interviews were transcribed verbatim by a company specialised in converting to written text qualitative research data *(Stage 1)*. Each transcript was repeatedly read by one researcher (NM), while listening to the audiotapes *(Stage 2)*. Single words, sentences or groups of sentences related to study questions were coded by one researcher (NM) and verified by another researcher (MPM) *(Stage 3)*. Any differences in interpretation were discussed with the research group and consensus was received. Once the key categories were identified inductively, the transcripts were purposively read to detect any discussion that deviated from these categories and an analytical matrix was developed *(Stage 4)*. Main and sub-categories were primarily developed deductively according to the medication use process previously published in the national MI Strategy (Appendix B)[24] *(Stage 5)*. Additionally, new main and sub-categories were inductively derived from the interview data. Codes were classified into main categories, and the encoded data were charted into a spreadsheet generated from the analytical matrix *(Stage 6)*. Based on the existing medication use process model (Appendix B), and complemented with participants' views identified from the interviews, a new conceptual framework of the medication use process was developed *(Stage 7)*. The results are presented in accordance with two main research questions, i.e., stakeholders' views on: 1) the well-implemented actions, and 2) the actions needing development in the medication use process. The results are classified into three operational levels: infrastructure *(macro)*, healthcare professional *(meso)* and patient *(micro)* level. This follows the conceptual framework applied to combine the functions of primary care with the dimensions of integrated care.[52] Numbers of encodings were counted according to the mentions by each participant and the summative numbers were set into the operational levels. The standards for reporting qualitative research (SRQR) was utilised when applicable.[53]

Add figure 1 in here.

Ensuring rigor of the analysis

In the conceptual model building, breakdown of the data to *macro*, *meso* and *micro* levels was used.[52] *Trustworthiness* of the analysis process was confirmed in every phase, including data preparation (e.g., verbatim transcripts), management of data (e.g., software was used in data coding) and reporting of results (e.g., a single coder with a reviewer).[54,55] To ensure the *credibility*, a previously known model of a medication use process[24] was used as an analysis matrix, supplemented with the main and sub-categories identified inductively from the data. Additionally, a theoretical method previously used in healthcare research[51] was applied in analysing data to strengthen *credibility*. To increase the *comprehensivity* of the study, two researchers – and when necessary the whole research group – were involved in the data analysis process. The content and structure of concepts created by content analysis were illustrated with the examples of quotations from various participants to indicate *conformability* and *objectivity.* Quotations have been selected to represent the identified main and sub-categories in the new conceptual framework developed for the medication use process.

Research ethics

The study was conducted according to good scientific practice, following the guidelines of the Finnish Advisory Board on Research Integrity.[56] According to the guidelines, the study was deemed to be exempt from requiring approval from the research ethics committee. The research plan was approved by the National MI Network before starting the data collection. Prior to the interviews, participants were informed in writing about the study and that the interviews will be tape-recorded. At the beginning of each interview they were asked to give informed consent. Participation was voluntary with the opportunity to withdraw from the study at any time. The recordings and interview notes were digitally stored and encrypted with a password. All data were anonymised and were accessible only to the authors. Privacy and confidentiality of the individuals participating in the study were ensured throughout the entire research project.

Patient and public involvement

Patient participation was taken into account by interviewing representatives from various national patient organisations who were active partners in the National MI Network. There was no real patients or public involvement in the planning phase or design of the study. The results of the study will be discussed in the MI Network for further actions of the national MI Strategy that will be extended to a new term lasting until 2026.

RESULTS

In total, 79 out of 111 members of the National MI Network participated in the study (participation rate 71%) representing 42 out of 53 stakeholders (Table 1). Females represented 77% (n=61) of participants. Interviews (n=43) were conducted as individual (n=22), pair (n=11) or group interviews (n=10), either face-to-face (79%, n=34), by telephone (12%, n=5), as video conferencing (7%, n=3) or as face-to-face and video conferencing (2%, n=1). Altogether, 3–6 participants attended the group interviews at a time. Four interviews included participants from more than one stakeholder organisation. A majority of the participants were pharmacists (43% of all participants, n=34), physicians (22%, n=17) and nurses (15%, n=12). Educational units were the most commonly represented stakeholder group (24% of the stakeholder organisations, n=10), including universities, polytechnics, vocational institutions and continuing education units.

Table 1 Characteristics of the individual stakeholder representatives (n=79) and the stakeholder organisations (n=42) participating in the study. (n=number of individual stakeholder representatives or stakeholder organisations)

Stakeholders by profession	**Individual stakeholder representatives who participated in the study**		**Individual stakeholder representatives in the MI Network[a]**	
	n	**%**	**n**	**%**
Pharmacists	34	43.0	41	36.9
Physicians	17	21.5	22	19.8
Nurses	12	15.2	15	13.5
Others	11	13.9	21	18.9
Practical nurses	2	2.5	2	1.8
Healthcare students	1[b]	1.3	4 [b-e]	3.6
Dentists	0	0	1	0.9
Not known	2	2.5	5	4.5
Altogether	79		111	
Stakeholders by type of affiliation	**Stakeholder organisations that participated in the study**		**Stakeholder organisations represented in the MI Network[a]**	
	n	**%**	**n**	**%**
Healthcare centers, hospitals and hospital districts, hospital pharmacies and dispensaries, university pharmacies	8	19.0	8	15.1
Patient associations and organisations	8	19.0	10	18.9
Professional organisations	7[b,d,e]	16.7	8 [b-e]	15.1
Universities	6[b,d,e]	14.3	6[b,d,e]	11.3
Scientific societies	4[b,d,f,g]	9.5	5[b,d,f,g]	9.4
Polytechnics, vocational institutions	3[e,h]	7.1	5[e,h]	9.4
National authorities	2	4.8	3	5.7
Organisations representing pharmaceutical industry	2	4.8	2	3.8
Continuing education units	1[b]	2.4	1[b]	1.9
Student associations	1[b]	2.4	4[b-e]	7.5
Others	0	0	1	1.9
Altogether	42		53	

[a]National Medicines Information (MI) Network, [b]pharmacy, [c]dentistry, [d]medicine, [e]nursing, [f]clinical pharmacology, [g]psychiatry, [h]practical nursing.

Well-implemented actions in the medication use process

The new conceptual framework illustrating well-implemented actions in the medication use process consisted of ten main categories of actions (Fig. 2 and 3). Of these, seven were derived deductively from the previous medication use process model (Appendix B) and three were inductively derived from the data (Fig. 3). All the inductively derived categories were at the infrastructure *(macro)* level. Around half of the participants (52%) reported well-implemented actions, mostly at the meso level (i.e., healthcare professionals). Of these actions, medication counselling by community pharmacists was considered the best implemented (n=26 mentions), followed by physicians' performance while starting a medication (n=14), and advice and guidance provided by nurses (n=14) (Appendix C).

Add figure 2 in here.

Add figure 3 in here.

Very few mentions of the well-implemented actions at the infrastructure *(macro)* level were present (Fig. 3). These related to the patient information transfer and electronic health records (EHRs) (n=4 mentions of being well-implemented) and multiprofessional collaboration (n=2), while none of the stakeholders mentioned management of the entire medication use process (n=0) or specialist services (n=0) as well-implemented.

Actions needing development in the medication use process

The stakeholders mentioned far more actions for development than well-established practices in the medication use process (211 vs. 68 mentions, respectively) (Fig. 2, 3 and 4). Almost all participants (94%) raised at least one area for improvement (Fig. 2 and 4, Appendix C). The highest number of mentions indicating a need for development concerned medication use process in home care and social care *(meso)* (n=34), patient information transfer and EHRs, including reconciled medication lists *(macro)* (n=33), and patients' management with the medication *(micro)* (n=27). At the infrastructure *(macro)* level, management of the entire medication use process (n=24) and multiprofessional collaboration (n=23) were also frequently mentioned as areas for development.

Add figure 4 in here.

In the medication use process in home care and social care units, such as nursing homes, most of the concerns related to skills, competences and inadequate training of practical nurses to appropriately manage the medications of their older clients (Fig. 4). A need for additional training in pharmacotherapy was raised, particularly for home care and nursing home staff to meet the requirements of their current work duties in geriatric care. Inadequate patient information transfer between care units and limited availability of EHRs in the medication use process were among the major concerns as not all professionals involved in the care team have access to complete and accurate patient information, such as laboratory results, or when the patient is transferred from a care unit to another. In addition, many stakeholders reported that the management of the entire medication use process needed development indicating fragmentation, lack of coordination and poor collaboration between different healthcare professionals and between professionals and patients. They also expressed concerns on treatment monitoring as it was not commonly conducted very systematically.

Finally, poor patient involvement during the entire medication use process was a concern reflecting a lack of motivation or adherence to treatment and an inability or unwillingness to communicate with healthcare professionals (Fig. 4). A further concern was that patients do not always have reconciled medication lists or treatment plans, which may not only challenge healthcare professionals at the point of prescribing and dispensing medicines, but also patients while using medicines at home. Additionally, patients' limited skills in searching reliable health and MI and insufficient medication counselling for particular patient groups, such as the deaf, people with vision impairment and using multiple medications, were identified as areas needing attention.

DISCUSSION

This study revealed that the medication use process of chronically ill patients using long-term medications requires development at every level of implementation. The major development needs in the infrastructure concern the coordination and management of care, transfer of patient information between care units, availability of a reconciled medication list, and local and national agreements on the responsibilities of patients and professionals involved in the medication use process. The most urgent development needs at the professional level focus on the entire medication use process in primary and social care, particularly in geriatric units where practical nurses' competences do not meet their actual work responsibilities. The current medication use process lacks genuine patient-centeredness, manifested by a lack of adherence, motivation and communication, and the inability of patients to retrieve information. Patients on long-term medications need to be better involved in implementing their treatment by improving empowerment and partnership, and by finding new ways to support self-management and treatment commitment.

According to the stakeholders, challenges in implementing the medication use process appear to be the greatest in primary care, especially in home care and social care units such as in nursing homes. This means social and healthcare units providing care for older adults in the poorest health conditions. The result may reflect that the Finnish population is aging rapidly and the care system has not been adequately prepared for the growing need to, for example, train care personnel in geriatric pharmacotherapy to safely manage the medications. This is particularly the case for practical nurses whose the responsibility for medication management in geriatric care units has increased remarkably even though their pharmacotherapy training is limited. Practical nurses have three-year vocational education that focuses on supportive and technical nursing, and, thus, they may not have adequate competence to take responsibility for medication. This finding is in line with previous studies showing that nursing personnel (e.g., practical nurses) working in home care and social welfare units may also lack pharmacotherapy knowledge and skills in providing MI.[28,57-60] The same trend and challenges have been found in other research and development programmes in Finland and other countries.[57,58] The challenge of safe management of medications and polypharmacy of older adults has been prioritised globally in the ongoing WHO Global Patient Safety Program "Medication Without Harm".[61] Further research should focus on geriatric care units in primary and social care to better understand the systems-based root causes and contributing factors of actual and potential risks in the current medication use processes.

Despite the pharmaceutical policy initiatives and wide recognition internationally of the importance of patient empowerment and involvement in healthcare,[2,61] our study reflects that it might not be actualised in the best possible way. It is worth remembering that the majority of the interviewees in this study were health professionals, even in cases they represented the voice of patients. Thus, the results are skewed to a professional opinion even in the patient perspective. Nevertheless, the results send a clear message that patients' involvement in their long-term medication should be significantly increased. To be successful, research and actions should focus on a patient approach in the implementation of long-term medications. Only the patients themselves can describe the issues that matter to them, affecting their motivation for treatment, success of self-management and empowerment. Future studies should focus on real patients to explore their perceptions and experiences.

In this study, the stakeholders reported that patients are not often willing to discuss their medications and medication-related problems. This may reflect their preferences, or capacity for participation, or uncertainty about the responsibilities and tasks of patients' and different healthcare professionals in the medication use process. A communicative relationship between healthcare professionals and patients is an essential driver for patient involvement in the medication use process, and for motivation for self-management and empowerment with medication use, especially for those with long-term medications.[37,38,50,62-64] Healthcare professionals should encourage patients to share experiences and concerns about their treatment. They also need to ensure access to MI throughout the process. Although the number of MI sources available for patients has increased, people might not always receive MI from any sources.[16,17,22] In Finland, the proportion of patients who report not receiving information on medicines they use from any healthcare professional has more than doubled between 1999 and 2014.[21] Actions are needed to ensure equal access of MI for all patients and throughout the medication use process to support self-management and empowerment.

Infrastructural factors leading to poor access to patient and MI and poor adherence, such as a lack of reconciled medication lists and treatment plans, and lack of personal communication with care providers should be further investigated from a patient perspective.[13,65] In particular, a reconciled medication list is essential for professionals and patients. For example, guidelines for patient-centred therapeutic counselling assume that the practitioner should review available patient information before the encounter and use the information gathered to determine what to discuss and agree on the treatment with the medicine user.[28,30,66]

Since this evaluation was conducted in 2015, shortcomings found in the infrastructure of the medication use process related to the coordination and availability of electronic health records have been recognised in the ongoing Rational Pharmacotherapy Action Plan 2022.[62] The Government Program[67-69] based action plan is intended to strengthen the actions at the infrastructure level, which were minor in 2015. At the same time, it extends the scope of development towards the meta level, including health and medicines policy-making that can facilitate infrastructural changes in the medication use process through information guidance, resource allocation and legislation.[70]

Strengths and limitations of this study

This pragmatic evaluation was carried out at an early stage of national MI Strategy's implementation. The aim was to conduct an evaluation by interview in order to obtain more detailed information from the stakeholders than would have been obtained, for example, through a survey. The interviews covered the whole range of stakeholders actively involved in implementing the MI Strategy. They can be assumed to be informants with the best understanding of the topic of research. However, the majority of the stakeholder representatives were healthcare professionals, half of them being pharmacists, which may have skewed the results. There was also an absence of real patients with chronic illnesses and medications, which may also distort results. The dynamics of the interviews may have been influenced by the fact that they were conducted as individual, pair or group interviews according to convenience of each stakeholder. The data from different types of interviews were combined and the relative power of the opinions was determined by counting the mentions for each action. The profession or stakeholder group was not specified during the analysis, as the aim was to obtain an overall understanding of the implementation of the medication use process rather than to compare views between professions or stakeholders. Moreover, participants' demographics, except gender, were not collected. The figure of the medication use process (Appendix B) was an important tool in the interviews to keep the discussion focused on core issues. Furthermore, the figure was also utilised as a framework in the deductive analysis, which was supplemented with an inductive analysis of the interview data. Thus, the figure was the basis for conducting the study and it has a strong influence on the study findings.

Implications and future research

This has been an eye-opening study that has helped us to understand the functionality and shortcomings of the entire medication use process. The theory-base, conceptual model and methodology applied in this study may be useful for future follow-up evaluations, or evaluating medication use processes in other settings. The key shortcomings highlighted by the stakeholders have formed the core of the Rational Pharmacotherapy Action Plan 2018–2022.[62] Actions are underway to improve the coordination and management of medication use process, e.g., by launching a reconciled medication list, and to increase patient engagement and partnership in their care. The Action Plan was based on the Government Program 2015–

2019, still being supported by the current Program as part of the ongoing social and health services reform.[67-69] Thus, it has a strong mandate to change the medication use process. Such long-term strategies as "Partnership in Medicine Taking" in the UK provide good practices to be benchmarked.[71] The Chronic Care Model is still a valid theoretical framework for getting the patient at the centre.[37,38]

Future research should focus on investigating the root causes for poor patient involvement in their own care. To improve medication adherence, the medication use process should be developed on a patient-oriented basis. This requires more qualitative research that listens to the long-term patients' experiences and modifies the medication use process accordingly. The implementation of the medication use process should be further studied in different patient groups, as also suggested by the Rational Pharmacotherapy Action Plan.[62,65] The most urgent need in this respect concerns older people who are at the highest risk for medication-related harm, particularly in primary care and social care institutions. Research should focus on enhancing coordination of care and improving usability of electronic systems supporting the implementation of medication use processes databases and systems.[5,72]

CONCLUSIONS

Weaknesses in the infrastructure of the medication use process reflecting the transfer of patient information, poorly functioning medication use processes in primary care and limited participation of patients in their care are priority areas while implementing the next steps of the national MI Strategy are found. Many of the challenges identified in this evaluation have been taken into consideration in the MI Strategy's implementation since 2015, the major challenges are also in the Rational Pharmacotherapy Action Plan 2018–2022 by the Ministry of Social Affairs and Health.

Acknowledgements The authors gratefully acknowledge the members of the National Medicines Information Network who participated in this study. The authors acknowledge the Elli Turunen Fund of the Finnish Cultural Foundation for providing funding. The authors warmly thank Perihan Ipek for assistance in collecting the data, and AMNielsen ApS and Chelsea Schneider for proofreading the manuscript.

Contributors NM, MA, MP-M and KH-A have been involved in designing the study, developing the interview guide, planning the analysis and reporting this particular study. NM performed the interviews and data analysis. MP-M verified the codings of the data. MA, MP-M and KH-A contributed in the interpretation of the data. NM prepared the initial draft of the manuscript. MA, MP-M and KH-A critically reviewed and revised the manuscript. All authors read and gave the final approval of the version to be published.

Funding This research was supported by the Elli Turunen Fund of the Finnish Cultural Foundation. The sponsors had no role in design and conduct of the study; collection, management, analysis, and interpretation of the data; or in preparation, review, or approval of the manuscript.

Competing interests None declared.

Patient consent for publication Not required.

Data availability statement No additional data available.

REFERENCES

1 World Health Organization. Innovative care for chronic conditions: Building blocks for actions. Global report. World Health Organization, 2002. www.who.int/chp/knowledge/publications/icccreport/en/ (Accessed 10 Dec 2019).

2 World Health Organization. Adherence to long-term therapies: Evidence for action. World Health Organization, 2003. www.who.int/chp/knowledge/publications/adherence_report/en/ (Accessed 10 Dec 2019).

3 Celio J, Ninane F, Bugnon O, Schneider MP. Pharmacist-nurse collaborations in medication adherence-enhancing interventions: A review. *Patient Educ Couns* 2018;101:1175–92.

4 Olsen CF, Bergland A, Debesay J, Bye A, Langaas AG. Striking a balance: Health care providers' experiences with home-based, patient-centered care for older people – A meta-synthesis of qualitative studies. *Patient Educ Couns* 2019;102:1991–2000.

5 Toivo T, Dimitrow M, Puustinen J, et al. Coordinating resources for prospective medication risk management of older home care clients in primary care: Procedure development and RCT study design for demonstrating its effectiveness. *BMC Geriatr* 2018;18:74.

6 Elvey R, Hassell K, Hall J. Who do you think you are? Pharmacists' perceptions of their professional identity. *Int J Pharm Pract* 2013;21:322–32.

7 Kusi-Appiah E, Dahlke S, Stahlke S. Nursing care providers' perceptions on their role contributions in patient care: An integrative review. *J Clin Nurs* 2018;27:3830–45.

8 Lawrence RA, McLoone JK, Wakefield CE, Cohn RJ. Primary care physicians' perspectives of their role in cancer care: A systematic review. *J Gen Intern Med* 2016;31:1222–36.

9 Berland A, Bentsen SB. Medication errors in home care: A qualitative focus group study. *J Clin Nurs* 2017;26:3734–41.

10 Teinilä T, Kaunisvesi K, Airaksinen M. Primary care physicians' perceptions of medication errors and error prevention in cooperation with community pharmacists. *Res Social Adm Pharm* 2011;7:162–79.

11 van Sluisveld N, Zegers M, Natsch S, Wollersheim H. Medication reconciliation at hospital admission and discharge: Insufficient knowledge, unclear task reallocation and lack of collaboration as major barriers to medication safety. *BMC Health Serv Res* 2012;12:170.

12 Mohammed AM, Moles RJ, Chen TF. Medication-related burden and patients' lived experience with medicine: A systematic review and metasynthesis of qualitative studies. *BMJ Open* 2016;6:e010035.

13 Kekäle M. Chronic myeloid leukemia patients' adherence to tyrosine kinase inhibitors in Finland: A journey of eighty-six patients [dissertation]. University of Helsinki, 2016. http://urn.fi/URN:ISBN:978-951-51-2353-4.

14 Puspitasari HP, Aslani P, Krass I. Pharmacists' and cosumers' viewpoints on counselling on prescription medicines in Australian community pharmacies. *Int J Pharm Pract* 2010;18:202–8.

15 Chisholm-Burns MA, Lee JK, Spivey CA, et al. US pharmacists' effect as team members on patient care: Systematic review and meta-analyses. *Med Care* 2010;48:923–33.

16 European Commission. High Level Pharmaceutical Forum 2005-2008: Conclusions and recommendations. European Communities, 2008. https://publications.europa.eu/en/publication-detail/-/publication/4fddf639-47cc-4f90-9964-142757d2515a (Accessed 10 Dec 2019).

17 International Pharmaceutical Federation. Medicines information: strategic development. The Hague: International Pharmaceutical Federation, 2017. www.fip.org/www/streamfile.php?filename=fip/publications/2017-01-Medicines-information-strategic-development.pdf (Accessed 10 Dec 2019).

18 Ryan R, Santesso N, Lowe D, et al. Interventions to improve safe and effective medicines use by consumers: An overview of systematic reviews. *Cochrane Database Syst Rev* 2014;CD007768.

19 Van Camp YP, Van Rompaey B, Elseviers MM. Nurse-led interventions to enhance adherence to chronic medication: Systematic review and meta-analysis of randomised controlled trials. *Eur J Clin Pharmacol* 2013;69:761–70.

20 Zolnierek KBH, DiMatteo MR. Physician communication and patient adherence to treatment: A meta-analysis. *Med Care* 2009;47:826–34.

21 Mononen N, Airaksinen MSA, Hämeen-Anttila K, Helakorpi S, Pohjanoksa-Mäntylä M. Trends in the receipt of medicines information among Finnish adults in 1999–2014: A nationwide repeated cross-sectional survey. *BMJ Open* 2019;9:e026377.

22 European Commission. High Level Group on innovation and provision of medicines in the European Union: Recommendations for action. G10 Medicines report. European Communities, 2002. http://ec.europa.eu/health/ph_overview/Documents/key08_en.pdf (Accessed 10 Dec 2019).

23 Ministry of Social Affairs and Health. Medicines Policy 2020: Towards efficient, safe, rational and cost effective use of medicines. Publications of the Ministry of Social Affairs and Health, 2011. http://urn.fi/URN:ISBN:978-952-00-3165-7 (Accessed 10 Dec 2019).

24 Finnish Medicines Agency Fimea. Rational use of medicines through information and guidance – Medicines information services: Current state and strategy for 2020. Serial Publication Fimea Develops, Assesses and Informs, 2012. http://urn.fi/URN:ISBN:978-952-5624-21-2 (Accessed 10 Dec 2019).

25 Hämeen-Anttila K, Luhtanen S, Airaksinen M, Pohjanoksa-Mäntylä M. Developing a national medicines information strategy in Finland – A stakeholders' perspective on the strengths, challenges and opportunities in medicines information. *Health Policy* 2013;111:200–5.

26 Airaksinen M, Ahonen R, Enlund H. The questions to ask about your medicines campaign – An evaluation of pharmacists and the public's response. *Med Care* 1998;36:422–7.

27 Kansanaho H. Implementation of the principles of patient counselling into practice in Finnish community pharmacies [dissertation]. University of Helsinki, 2006. http://urn.fi/URN:ISBN:952-10-2877-7.

28 Mononen N, Järvinen R, Hämeen-Anttila K, et al. A national approach to medicines information research: A systematic review. *Res Social Adm Pharm* 2018;14:1106–24.

29 Pohjanoksa-Mäntylä M. Medicines information sources and services for consumers: A special focus on the Internet and people with depression [dissertation]. University of Helsinki, 2010. http://urn.fi/URN:ISBN:978-952-10-6128-8.

30 Puumalainen I. Development of instruments to measure the quality of patient counselling [dissertation]. University of Kuopio, 2005. http://urn.fi/URN:ISBN:951-27-0053-0.

31 Medicines Act (Finland) 395/1987. https://www.finlex.fi/fi/laki/ajantasa/1987/19870395 (Accessed 10 Dec 2019).

32 Decree on the prescription of medicines 1088/2010. https://www.finlex.fi/fi/laki/alkup/2010/20101088 (Accessed 10 Dec 2019).

33 Salonen I. National Medicines Information Strategy – Medicines related political actions in Finland and in the European Union in the 21st century to improve the quality and availability of the medicines information directed to the consumers [master's thesis]. University of Helsinki, 2010. http://urn.fi/URN:NBN:fi-fe20180115196 (Accessed 7 Mar 2020).

34 Department of Health. Better information, better choices, better health – Putting information at the centre of health. London: Department of Health, 2004.

35 Young N. National strategies for health and medicines information in the European Union: Experiences in the UK and Finland. Report. University of Helsinki, 2010.

36 Järvinen R, Enlund H, Airaksinen M, Kleme J, Mononen N, Hämeen-Anttila K. Medicines information research in Finland – A report to support the activities of the Medicines Information Network. Serial Publication Fimea Develops, Assesses and Informs 7/2013. Finnish Medicines Agency, 2013. http://urn.fi/URN:ISBN:978-952-5624-37-3 (Accessed 7 Mar 2020).

37 Wagner E.H. Chronic disease management: What will it take to improve cafe for chronic illness? *Eff Clin Pract* 1998;1:2–4.

38 Wagner EH, Austin BT, Hindmarsh M, Schaefer J, Bonomi A. Improving chronic illness care: Translating evidence into action. *Health Aff (Millwood)* 2001;20:64–78.

39 Nikander J, Tuominen-Thuesen M. National development programme for social welfare and health care (KASTE 2010–2015) External evaluation – Final report. Reports and memorandums of the Ministry of Social Affairs and Health, 2016. http://urn.fi/URN:ISBN:978-952-00-3800-7 (Accessed 10 Dec 2019).

40 Bults M, Beaujean DJMA, Wijkmans CJ, Timen A, Richardus JH, Voeten HACM. Why did patients with cardiovascular disease in the Netherlands accept Q fever vaccination? *Vaccine* 2012;30:3369–75.

41 Hamrosi KK, Aslani P, Raynor DK. Beyond needs and expectations: Identifying the barriers and facilitators to written medicine information provision and use in Australia. *Health Expect* 2014;17:220–31.

42 Hamrosi KK, Raynor DK, Aslani P. Pharmacist, general practitioner and consumer use of written medicine information in Australia: Are they on the same page? *Res Social Adm Pharm* 2014;10:656–68.

43 Hämeen-Anttila K, Pietilä K, Pylkkänen L, Pohjanoksa-Mäntylä M. Internet as a source of medicines information (MI) among frequent internet users. Res Soc Adm Pharm 2018;14:758–764.

44 Armitage LC, Kassavou A, Sutton S. Do mobile device apps designed to support medication adherence demonstrate efficacy? A systematic review of randomised controlled trials, with meta-analysis. *BMJ Open* 2020;10:e032045.

45 Baumgartner PC, Haynes RB, Hersberger KE, Arnet I. A systematic review of medication adherence thresholds dependent of clinical outcomes. *Front Pharmacol* 2018;9:1290.

46 Conn VS, Ruppar TM, Enriquez M, Cooper P. Medication adherence interventions that target subjects with adherence problems: Systematic review and meta-analysis. *Res Social Adm Pharm* 2016;12:218–46.

47 Conn VS, Ruppar TM, Enriquez M, Cooper PS. Patient-centered outcomes of medication adherence interventions: Systematic review and meta-analysis. *Value Health* 2016;19:277–85.

48 Costa E, Giardini A, Savin M, et al. Interventional tools to improve medication adherence: Review of literature. *Patient Prefer Adherence* 2015;9:1303–14.

49 Torres-Robles A, Wiecek E, Tonin FS, Benrimoj SI, Fernandez-Llimos F, Garcia-CardenasV. Comparison of interventions to improve long-term medication adherence across different clinical conditions: A systematic review with network meta-analysis. *Front Pharmacol* 2018;9:1454.

50 Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. *Am J Hosp Pharm* 1990;7:533–43.

51 Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Med Res Methodol* 2013;13:117.

52 Valentijn PP, Schepman SM. Understanding integrated care: A comprehensive conceptual framework based on the integrative functions on primary care. *Int J Integr Care* 2013;13:e010.

53 O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med* 2014;89:1245–51.

54 Elo S, Kääriäinen M, Kanste O, Pölkki T, Utriainen K, Kyngäs H. Qualitative content analysis: A focus on trustworthiness. *SAGE Open* 2014;4.

55 Raskind IG, Shelton RC, Comeau DL, Cooper HLF, Griffith DM, Kegler MC. A review of qualitative data analysis practices in health education and health behavior research. *Health Educ Behav* 2019; 46:32-39.

56 Finnish National Board on Research Integrity TENK. The ethical principles of research with human participants and ethical review in the human sciences in Finland. www.tenk.fi/sites/tenk.fi/files/Ihmistieteiden_eettisen_ennakkoarvioinnin_ohje_2019.pdf (Accessed 10 Dec 2019).

57 Kallio S, Kumpusalo-Vauhkonen A, Järvensivu T, Mäntylä A, Pohjanoksa-Mäntylä M, Airaksinen M. Towards interprofessional networking in medication management of the aged: Current challenges and potential solutions in Finland. *Scand J Prim Health Care* 2016;34:368–76.

58 Sawan M, Jeon YH, Chen TF. Relationship between organizational culture and the use of psychotropic medicines in nursing homes: A systematic integrative review. *Drugs Aging* 2018;35:189–211.

59 Sneck S, Saarnio R, Isola A, Boigu R. Medication competency of nurses according to theoretical and drug calculation online exams: A descriptive correlational study. *Nurse Educ Today* 2016;36:195–201.

60 Sulosaari V, Huupponen R, Torniainen K, Hupli M, Puukka P, Leino-Kilpi H. Medication education in nursing programmes in Finland - Findings from a national survey. *Collegian* 2014;21:327–35.

61 World Health Organization. Medication without harm: Global patient safety challenge on medication safety. World Health Organization, 2017. www.who.int/patientsafety/medication-safety/medication-without-harm-brochure/en/ (Accessed 10 Dec 2019).

62 Hämeen-Anttila K, Närhi U, Tahvanainen H. Rational Pharmacotherapy action plan – Final report. Reports and memorandums of the Ministry of Social Affairs and Health, 2018. http://urn.fi/URN:ISBN:978-952-00-3930-1 (Accessed 10 Dec 2019).

63 National Institute for Health and Care Excellence NICE. Medicines optimisation: the safe and effective use of medicines to enable the best possible outcomes. National Institute for Health and Care Excellence NICE, 2015. https://www.nice.org.uk/guidance/ng5 (Accessed 10 Mar 2020).

64 World Health Organization. Health 2020: A European policy framework and strategy for the 21st century. World Health Organization, 2013. http://www.euro.who.int/__data/assets/pdf_file/0011/199532/Health2020-Long.pdf?ua=1 (Accessed 10 Mar 2020).

65 Airaksinen M, Hämeen-Anttila K, Saastamoinen L. Effective use of research data: Research strategy for rational pharmacotherapy 2018–2022. Reports and memorandums of the Ministry of Social Affairs and Health, 2018. http://urn fi/URN:ISBN:978-952-00-3905-9 (Accessed 10 Dec 2019).

66 United States Pharmacopeia. Medication counselling behavior guidelines. United States Pharmacopeia, 1997.

67 Prime Minister's Office. Finland, a land of solutions – Strategic programme of Prime Minister Juha Sipilä's Government 29 May 2015. Government Publications, 2015. https://vnk.fi/documents/10184/1427398/Ratkaisujen+Suomi_EN_YHDISTETTY_netti.pdf/8d2e1a66-e24a-4073-8303-ee3127fbfcac/Ratkaisujen+Suomi_EN_YHDISTETTY_netti.pdf (Accessed 10 Dec 2019).

68 Finnish Government. Programme of Prime Minister Antti Rinne's Government 6 June 2019. Inclusive and competent Finland – A socially, economically and ecologically sustainable society. Publications of the Finnish Government, 2019. http://urn.fi/URN:ISBN:978-952-287-760-4 (Accessed 10 Dec 2019).

69 Finnish Government. Programme of Prime Minister Sanna Marin's Government 10 December 2019. Inclusive and competent Finland – A socially, economically and ecologically sustainable society. Publications of the Finnish Government, 2019. http://urn.fi/URN:ISBN:978-952-287-811-3 (Accessed 27 Mar 2020).

70 Guler S, Hurton, S, winn MC, Molinari M. Levels in decision making and techniques for clinicians. *International Journal of Digestive Diseases* 2015;1.

71 Marinker M, Royal Pharmaceutical Society of Great Britain. From compliance to concordance: Achieving shared goals in medicine taking. London: Royal Pharmaceutical Society in partnership with Merck Sharp & Dohme, 1997.

72 Toivo T, Airaksinen M, Dimitrow M, et al. Enhanced coordination of care to reduce medication risks in older home care clients in primary care: a randomized controlled trial. *BMC Geriatr* 2019;19:332.

LEGENDS OF THE FIGURES

Fig. 1 Content analysis process applying the Framework Method.[51]

Fig. 2 Categories of themes derived deductively (marked as blue) and inductively (marked as green) from the stakeholders' interviews (n=42, involving 79 interviewees) on well-implemented actions and actions needing development in medication use process for patients with chronic illnesses. (n=a summative of number of the single interviewee's mentions)

Fig. 3 Stakeholders' views on well-implemented actions in medication use process for patients with chronic illnesses. Categories derived deductively are marked as blue (n=7) and categories emerged inductively from the stakeholders' interviews are marked as green (n=3). (n=a summative of number of the single interviewee's mentions, HCP=healthcare professional)

Fig. 4 Stakeholders' views on actions needing development in medication use process for patients with chronic illnesses. Categories derived deductively are marked as blue (n=7) and categories emerged inductively from the stakeholders' interviews are marked as green (n=3). (n=a summative of number of the single interviewee's mentions, HCP=healthcare professional)

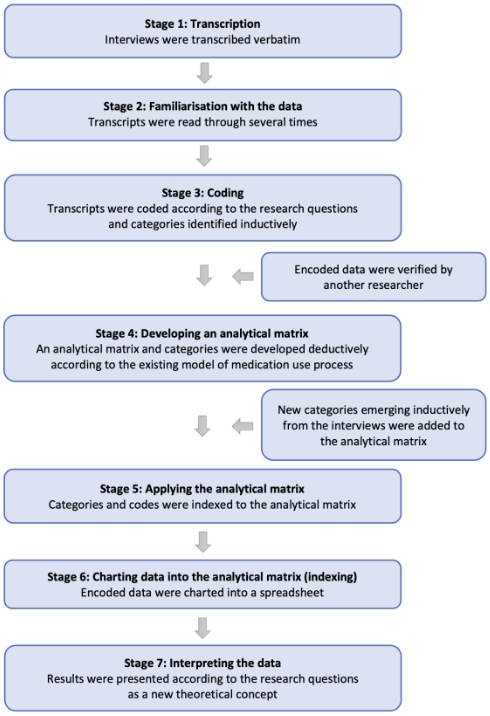


Fig. 1 Content analysis process applying the Framework Method.[46]

209x297mm (300 x 300 DPI)

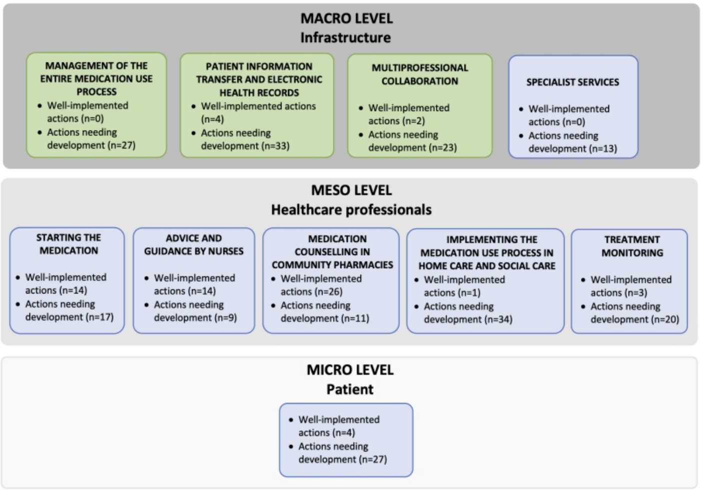
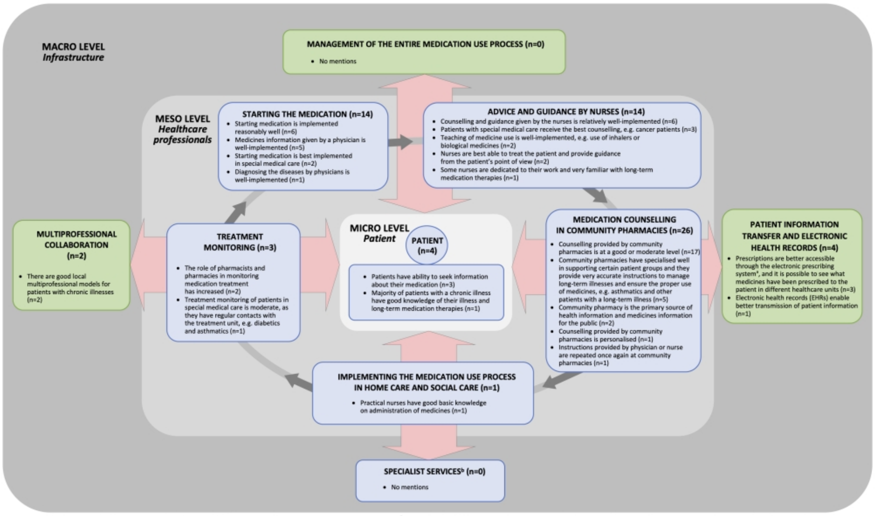


Fig. 2 Categories of themes derived deductively (marked as blue) and inductively (marked as green) from the stakeholders' interviews (n=42, involving 79 interviewees) on well-implemented actions and actions needing development in medication use process for patients with chronic illnesses. (n=a summative of number of the single interviewee's mentions)

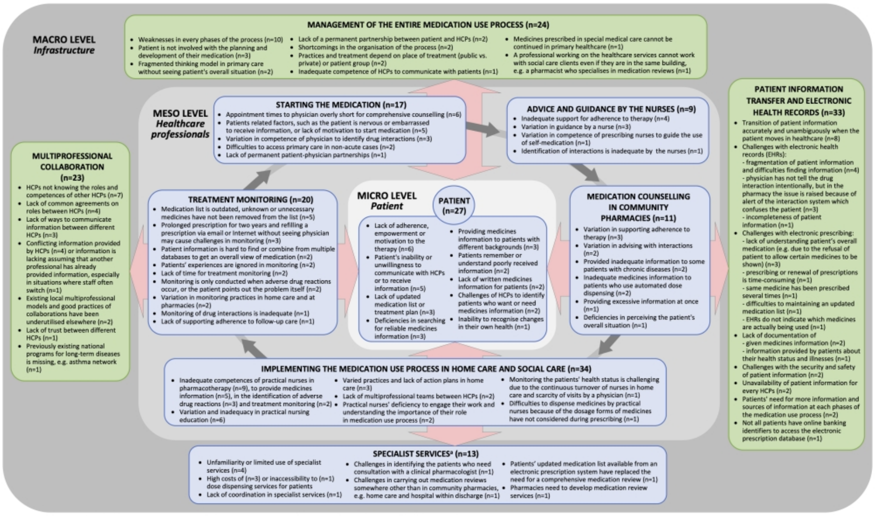
209x297mm (300 x 300 DPI)



[a]All prescriptions must be electronically prescribed from 1 January 2017, [b]e.g. clinical pharmacology consultation services and comprehensive medication reviews.

Fig. 3 Stakeholders' views on well-implemented actions in medication use process for patients with chronic illnesses. Categories derived deductively are marked as blue (n=7) and categories emerged inductively from the stakeholders' interviews are marked as green (n=3). (n=a summative of number of the single interviewee's mentions, HCP=healthcare professional)

297x209mm (300 x 300 DPI)



MANAGEMENT OF THE ENTIRE MEDICATION USE PROCESS (n=24)

- Weaknesses in every phases of the process (n=10)
- Patient is not involved with the planning and development of their medication (n=3)
- Fragmented thinking model in primary care without seeing patient's overall situation (n=2)
- Lack of a permanent partnership between patient and HCPs (n=2)
- Shortcomings in the organisation of the process (n=2)
- Practices and treatment depend on place of treatment (public vs. private) or patient group (n=2)
- Inadequate competence of HCPs to communicate with patients (n=1)
- Medicines prescribed in special medical care cannot be continued in primary healthcare (n=1)
- A professional working on the healthcare services cannot work with social care clients even if they are in the same building, e.g. a pharmacist who specialises in medication reviews (n=1)

MULTIPROFESSIONAL COLLABORATION (n=23)

- HCPs not knowing the roles and competences of other HCPs (n=7)
- Lack of common agreements on roles between HCPs (n=4)
- Lack of ways to communicate information between different HCPs (n=3)
- Conflicting information provided by HCPs (n=4) or information is lacking assuming that another professional has already provided information, especially in situations where staff often switch (n=1)
- Existing local multiprofessional models and good practices of collaborations have been underutilised elsewhere (n=2)
- Lack of trust between different HCPs (n=1)
- Previously existing national programs for long-term diseases is missing, e.g. asthma network (n=1)

STARTING THE MEDICATION (n=17)

- Appointment times to physician overly short for comprehensive counselling (n=6)
- Patients related factors, such as the patient is nervous or embarrassed to receive information, or lack of motivation to start medication (n=5)
- Variation in competence of physician to identify drug interactions (n=3)
- Difficulties to access primary care in non-acute cases (n=2)
- Lack of permanent patient-physician partnerships (n=1)

ADVICE AND GUIDANCE BY THE NURSES (n=9)

- Inadequate support for adherence to therapy (n=4)
- Variation in guidance by a nurse (n=3)
- Variation in competence of prescribing nurses to guide the use of self-medication (n=1)
- Identification of interactions is inadequate by the nurses (n=1)

TREATMENT MONITORING (n=20)

- Medication list is outdated, unknown or unnecessary medicines have not been removed from the list (n=5)
- Prolonged prescription for two years and refilling a prescription via email or Internet without seeing physician may cause challenges in monitoring (n=3)
- Patient information is hard to find or combine from multiple databases to get an overall view of medication (n=2)
- Patients' experiences are ignored in monitoring (n=2)
- Lack of time for treatment monitoring (n=2)
- Monitoring is only conducted when adverse drug reactions occur, or the patient points out the problem itself (n=2)
- Variation in monitoring practices in home care and at pharmacies (n=2)
- Monitoring of drug interactions is inadequate (n=1)
- Lack of supporting adherence to follow-up care (n=1)

PATIENT (n=27)

- Lack of adherence, empowerment or motivation to the therapy (n=6)
- Patient's inability or unwillingness to communicate with HCPs or to receive information (n=5)
- Lack of updated medication list or treatment plan (n=3)
- Deficiencies in searching for reliable medicines information (n=3)
- Providing medicines information to patients with different backgrounds (n=3)
- Patients remember or understand poorly received information (n=2)
- Lack of written medicines information for patients (n=2)
- Challenges of HCPs to identify patients who want or need medicines information (n=2)
- Inability to recognise changes in their own health (n=1)

MEDICATION COUNSELLING IN COMMUNITY PHARMACIES (n=11)

- Variation in supporting adherence to therapy (n=3)
- Variation in advising with interactions (n=2)
- Provided inadequate information to some patients with chronic diseases (n=2)
- Inadequate medicines information to patients who use automated dose dispensing (n=2)
- Providing excessive information at once (n=1)
- Deficiencies in perceiving the patient's overall situation (n=1)

PATIENT INFORMATION TRANSFER AND ELECTRONIC HEALTH RECORDS (n=33)

- Transition of patient information accurately and unambiguously when the patient moves in healthcare (n=8)
- Challenges with electronic health records (EHRs):
  - fragmentation of patient information and difficulties finding information (n=4)
  - physician has not tell the drug interaction intentionally, but in the pharmacy the issue is raised because of alert of the interaction system which confuses the patient (n=3)
  - incompleteness of patient information (n=1)
- Challenges with electronic prescribing:
  - lack of understanding patient's overall medication (e.g. due to the refusal of patient to allow certain medicines to be shown) (n=3)
  - prescribing or renewal of prescriptions is time-consuming (n=1)
  - same medicine has been prescribed several times (n=1)
  - difficulties to maintaining an updated medication list (n=1)
  - EHRs do not indicate which medicines are actually being used (n=1)
- Lack of documentation of
  - given medicines information (n=2)
  - information provided by patients about their health status and illnesses (n=1)
- Challenges with the security and safety of patient information (n=2)
- Unavailability of patient information for every HCPs (n=2)
- Patients' need for more information and sources of information at each phases of the medication use process (n=2)
- Not all patients have online banking identifiers to access the electronic prescription database (n=1)

IMPLEMENTING THE MEDICATION USE PROCESS IN HOME CARE AND SOCIAL CARE (n=34)

- Inadequate competences of practical nurses in pharmacotherapy (n=9), to provide medicines information (n=5), in the identification of adverse drug reactions (n=3) and treatment monitoring (n=2)
- Variation and inadequacy in practical nursing education (n=6)
- Varied practices and lack of action plans in home care (n=3)
- Lack of multiprofessional teams between HCPs (n=2)
- Practical nurses' deficiency to engage their work and understanding the importance of their role in medication use process (n=2)
- Monitoring the patients' health status is challenging due to the continuous turnover of nurses in home care and scarcity of visits by a physician (n=1)
- Difficulties to dispense medicines by practical nurses because of the dosage forms of medicines have not considered during prescribing (n=1)

SPECIALIST SERVICES[a] (n=13)

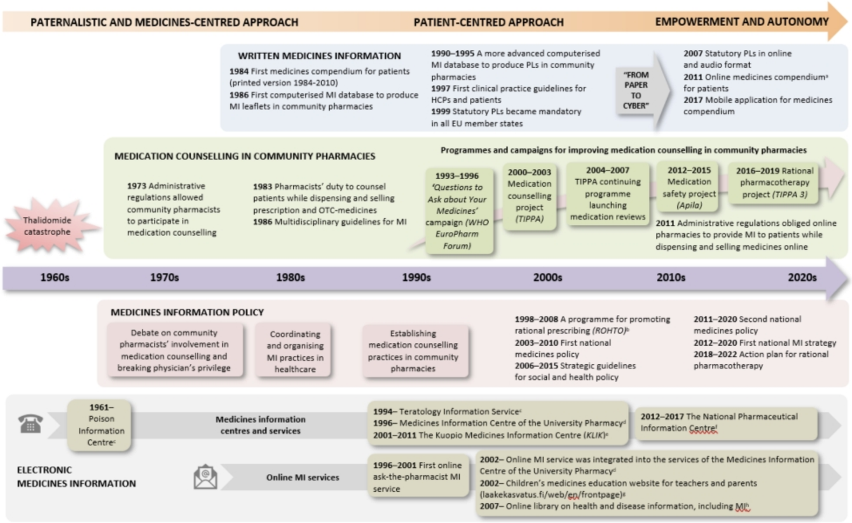
- Unfamiliarity or limited use of specialist services (n=4)
- High costs of (n=3) or inaccessibility to (n=1) dose dispensing services for patients
- Lack of coordination in specialist services (n=1)
- Challenges in identifying the patients who need consultation with a clinical pharmacologist (n=1)
- Challenges in carrying out medication reviews somewhere other than in community pharmacies, e.g. home care and hospital within discharge (n=1)
- Patients' updated medication list available from an electronic prescription system have replaced the need for a comprehensive medication review (n=1)
- Pharmacies need to develop medication review services (n=1)

[a] e.g. clinical pharmacology consultation services and comprehensive medication reviews.

Fig. 4 Stakeholders' views on actions needing development in medication use process for patients with chronic illnesses. Categories derived deductively are marked as blue (n=7) and categories emerged inductively from the stakeholders' interviews are marked as green (n=3). (n=a summative of number of the single interviewee's mentions, HCP=healthcare professional)

297x209mm (300 x 300 DPI)

Appendix A. Evolution and milestones of medicines information to patients in Finland since the 1960s.



PATERNALISTIC AND MEDICINES-CENTRED APPROACH

PATIENT-CENTRED APPROACH

EMPOWERMENT AND AUTONOMY

WRITTEN MEDICINES INFORMATION

1984 First medicines compendium for patients (printed version 1984-2010)

1986 First computerised MI database to produce MI leaflets in community pharmacies

1990–1995 A more advanced computerised MI database to produce PLs in community pharmacies

1997 First clinical practice guidelines for HCPs and patients

1999 Statutory PLs became mandatory in all EU member states

"FROM PAPER TO CYBER"

2007 Statutory PLs in online and audio format

2011 Online medicines compendium[a] for patients

2017 Mobile application for medicines compendium

MEDICATION COUNSELLING IN COMMUNITY PHARMACIES

Thalidomide catastrophe

1973 Administrative regulations allowed community pharmacists to participate in medication counselling

1983 Pharmacists' duty to counsel patients while dispensing and selling prescription and OTC-medicines

1986 Multidisciplinary guidelines for MI

Programmes and campaigns for improving medication counselling in community pharmacies

1993–1996 *'Questions to Ask about Your Medicines'* campaign *(WHO EuroPharm Forum)*

2000–2003 Medication counselling project *(TIPPA)*

2004–2007 TIPPA continuing programme launching medication reviews

2012–2015 Medication safety project *(Apila)*

2016–2019 Rational pharmacotherapy project *(TIPPA 3)*

2011 Administrative regulations obliged online pharmacies to provide MI to patients while dispensing and selling medicines online

MEDICINES INFORMATION POLICY

Debate on community pharmacists' involvement in medication counselling and breaking physician's privilege

Coordinating and organising MI practices in healthcare

Establishing medication counselling practices in community pharmacies

1998–2008 A programme for promoting rational prescribing *(ROHTO)*[b]

2003–2010 First national medicines policy

2006–2015 Strategic guidelines for social and health policy

2011–2020 Second national medicines policy

2012–2020 First national MI strategy

2018–2022 Action plan for rational pharmacotherapy

ELECTRONIC MEDICINES INFORMATION

1961– Poison Information Centre[c]

Medicines information centres and services

1994– Teratology Information Service[c]

1996– Medicines Information Centre of the University Pharmacy[d]

2001–2011 The Kuopio Medicines Information Centre (*KLIK*)[e]

2012–2017 The National Pharmaceutical Information Centre[f]

Online MI services

1996–2001 First online ask-the-pharmacist MI service

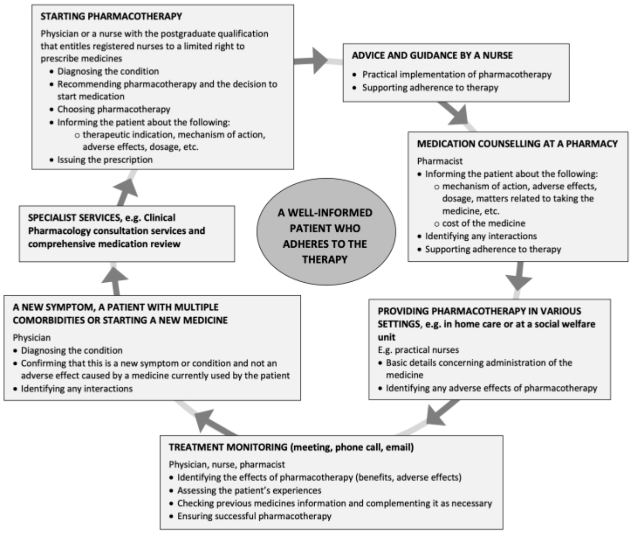
2002– Online MI service was integrated into the services of the Medicines Information Centre of the University Pharmacy[d]

2002– Children's medicines education website for teachers and parents (laakekasvatus.fi/web/en/frontpage)[g]

2007– Online library on health and disease information, including MI[h]

EU=European Union, HCP=healthcare professional, MI=medicines information, OTC=over-the-counter, PL=package leaflet. [a]Integrated into the online health library, [b]ROHTO initially worked as a project in 1998–2001, and after that it operated as the Centre for Pharmacotherapy Development ROHTO under the Ministry of Social Affairs and Health (2002–2008), [c]Service provided by the Hospital District of Helsinki and Uusimaa (HUS), [d]Service provided by the University Pharmacy which is owned by University of Helsinki, [e]Owned by the University of Kuopio/the University of Eastern Finland, [f]Owned by the University of Eastern Finland and Pharmaceutical Information Centre in 2012–2014, owned by Pharmaceutical Information Centre since 2015, and provided MI service to consumers until 2017, [g]Website portal owned by the University of Kuopio/the University of Eastern Finland during 2002–2011, since 2012 owned by the Finnish Medicines Agency Fimea, [h]Owned by the Finnish Medical Society Duodecim.

297x209mm (300 x 300 DPI)



Appendix B. Medicine use process for patients with chronic illnesses as illustrated in the National Medicines Information Strategy (© Fimea 2012).[24]

297x209mm (300 x 300 DPI)

Appendix C. Illustrative examples of the expressions (translated from Finnish) mentioned by the interviewees on the well-implemented actions and actions needing development in the medication use process categorised by main categories (n=10) emerged from the interviews. (P=participant of the study)

MAIN CATEGORIES	WELL-IMPLEMENTED ACTIONS	ACTIONS NEEDING DEVELOPMENT
Infrastructure level *(macro)*		
Management of the entire medication use process	No mentions.	"Well, it's not an individual employee, but the entire medication use process should be better organised..." *[representative from the hospital, P72]* "And it also happens in primary healthcare, that they do identify a single illness or health problem but do not take account the person as a whole. This represents a fragmented way of thinking." *[representative from the university, P42]*
Patient information transfer and electronic health records	"Electronic prescriptions have provided more clarity [to the medication use process]... via electronic prescription, with both nurses and physician providing patient care, for example for elderly people have a more comprehensive and updated view on patients' medication than previously. It has been a great improvement..." *[representative from the university, P40]*	"Numerous investigations have identified problems, such as lack of critical patient information or incorrect information transfer, in the medication use process. It's scary. In a way, it pulls the plug out of many things." *[representative from the scientific society, P66]* "Well, I think we should pay attention to how medications are recorded in the electronic health records and how information is safely visible there. That's catastrophic, that the same medicine may be listed there many times. But instead there is no information on when medication has been started or discontinued. [Medication] lists don't update themselves, but someone needs to reconcile them." *[representative from the healthcare center, P9]*
Multiprofessional collaboration	*"*Excellent local multiprofessional models for cooperation, particularly in long-term patient care, already exist.*"* *[representative form the national authority, P6]*	"Healthcare professionals should know better the tasks and responsibilities of each other, and, on the other hand, should also be familiar with each other's knowledge, and what they can and cannot do." *[representative from the university, P40]* "Do we know the skills of different health professionals [participating in the medication use process] well enough and how we could make optimal use of them. On the other hand, can we fully trust other professions." *[representative from the professional organisation, P18]*
Specialist services	No mentions.	"Comprehensive medication reviews... big efforts should be made to make the reviews available to patients in need, so that they don't have to pay for them themselves. This referral policy or some other way, such as the implementation of medication reviews at the pharmacies, is still unrealised. *[representative from the professional organisation, P23]*

Healthcare professionals level *(meso)*		
Starting the medication	"Starting the medication works rather well at the moment. It is always a physician who diagnoses a disease and counsels the patient how to manage their disease and treatment. Additionally, there is also a nurse commonly involved in counselling. Especially from the perspective of special care, this stage of the medication use process seems to work." *[representative from the hospital districts, P73]* "Starting the medication, I think it works relatively well." *[representative from the university, P69]*	"As a physician, I commonly prescribe medicines. While prescribing, there is often limited time for medication counselling. You just really manage to say that "here is your prescription and inform how patient should take her/his medication." *[representative from the patient organisation, P71]* "Usually, patients are not very responsive to counselling, they may not remember what they have been told during the physician's visit. *[representative from the professional organisation, P51]*
Advice and guidance by nurses	"I do have the belief that while the nurses and midwifes have limited prescribing rights, they also have a good knowledge on what to tell patients about medicines." *[representative from the patient organisation, P56]* "And of course, In special medical care, patients will receive the best counselling on their medicines. This concerns for example cancer patients." *[representative from community pharmacy, P64]*	"Advice and guidance given by a nurse varies greatly depending on the resources and indications." *[representative from the patient organisation, P71]* "Nurses should support their patients' adherence." *[representative from the professional organisation, P26]* "Nurses may not counsel patients much about drug-drug interactions, although it would be really crucial for all patients." *[representative from the polytechnic, P74]*
Medication counselling in the community pharmacies	"The best knowledge about medicines is really in the community pharmacies." *[representative from the professional organisation, P50]* "The process is best implemented in community pharmacies. There has been a systematic attempt to develop medication counselling for patients with certain diseases, such as asthma and other chronic diseases." *[representative from the scientific society, P59]*	"Pharmacists should not give as much information about medicines as they currently do. It is probably because they wish to play safe and explain all the possible adverse drug reactions and all other things. It may result in decreased adherence." *[representative from the university, P78]* "Supporting medication adherence, I do not know, maybe it is supported in some way, but I also think there occurs [among healthcare professionals] some paternalistic ways of thinking. They may consider that there is no need to tell everything. If the physician prescribes and counsels something, the patient should just take his or her medication and follow instructions." *[representative from the university, P28]*

Implementing the medication use process in home care and social care	"I would believe and really hope that practical nurses have a good basic knowledge on the administration of medicines." *[representative from the university, P76]*	"There is quite a lot of variation in nursing education as I understand it, because the aims of the education are formulated relatively loosely, and it depends on the local possibilities." *[representative from the university, P40]* "This medication use process is as strong as its weakest and less educated link, which commonly is a practical nurse or assistant or even an entirely untrained person who medicates patients. It is not certain if they have updated information and knowledge. Either they may not have for example ability to identify adverse drug reactions." *[representative from the patient association, P49]*
Treatment monitoring	"Treatments are well-monitored in relation to chronic medications and chronic illnesses, such as diabetes. Then there is a regular contact with particular physician." *[representative from the university, P42]*	It is really a challenge at the moment that the medication lists are not updated... And I think it is especially difficult when patient has multiple medications in use…When you have a lot of medicines which have all been prescribed in different places and by different physician, it seems that there is sometimes no one with the overall idea of the drug load. *[representative from the pharmacy, P21]* "Treatment monitoring, and especially the identification of potential adverse drug reactions, is perhaps the most challenging part in the medication use process. People do not know when to contact healthcare. It is also unclear how well they [ADR's] are recognised in healthcare. That's the challenge." *[representative from the patient organisation, P71]*
Patient level *(micro)*		
Patient	"Patients with chronic illnesses know a lot about their condition and medications. They also seek information. I'm not worried about the information sources that they use. Certainly, most of them use reliable sources." *[representative from the university, P78]*	"Patients do not even want to know [about the medicines they use]. This is something that healthcare professionals should recognise. They do not really remember all things that they have been told, and there is not even enough time for medication counselling during the visit with physician. In particular, when they receive a new diagnosis, they can concentrate only on that, and it is fair enough if they remember to take their pill every day, that's enough." *[representative from the scientific society, P29]* "It is really difficult to ask questions [from the physician] as patients may not know what to ask. And on the other hand, patients may be afraid that they will ask naive questions..." *[representative from the university, P76]*

Reporting checklist for qualitative study.

Based on the SRQR guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the SRQRreporting guidelines, and cite them as:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. Acad Med. 2014;89(9):1245-1251.

		Reporting Item	Page Number
Title			
	#1	Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g. ethnography, grounded theory) or data collection methods (e.g. interview, focus group) is recommended	1

Abstract			
	#2	Summary of the key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results and conclusions	2
Introduction			
Problem formulation	#3	Description and signifcance of the problem / phenomenon studied: review of relevant theory and empirical work; problem statement	4
Purpose or research question	#4	Purpose of the study and specific objectives or questions	5
Methods			
Qualitative approach and research paradigm	#5	Qualitative approach (e.g. ethnography, grounded theory, case study, phenomenolgy, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g. postpositivist, constructivist / interpretivist) is also recommended; rationale. The rationale should briefly discuss the justification for choosing that theory, approach, method or technique rather than other options available; the assumptions and limitations implicit in those choices and how those choices influence study conclusions and transferability. As appropriate the	6,7

		rationale for several items might be discussed together.	
Researcher characteristics and reflexivity	[#6]()	Researchers' characteristics that may influence the research, including personal attributes, qualifications / experience, relationship with participants, assumptions and / or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results and / or transferability	7
Context	[#7]()	Setting / site and salient contextual factors; rationale	5,6
Sampling strategy	[#8]()	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g. sampling saturation); rationale	5,6
Ethical issues pertaining to human subjects	[#9]()	Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	8
Data collection methods	[#10]()	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources / methods, and modification of procedures in response to evolving study findings; rationale	7,Fig.2

Data collection instruments and technologies	#11	Description of instruments (e.g. interview guides, questionnaires) and devices (e.g. audio recorders) used for data collection; if / how the instruments(s) changed over the course of the study	6,7
Units of study	#12	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	8, Table 1
Data processing	#13	Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and 4nonymization / deidentification of excerpts	7, Fig.2
Data analysis	#14	Process by which inferences, themes, etc. were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale	7, Fig.2
Techniques to enhance trustworthiness	#15	Techniques to enhance trustworthiness and credibility of data analysis (e.g. member checking, audit trail, triangulation); rationale	7
Results/findings			
Syntheses and interpretation	#16	Main findings (e.g. interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	8-11

Links to empirical data	#17	Evidence (e.g. quotes, field notes, text excerpts, photographs) to substantiate analytic findings	Appendix A
Discussion			
Intergration with prior work, implications, transferability and contribution(s) to the field	#18	Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application / generalizability; identification of unique contributions(s) to scholarship in a discipline or field	11-13
Limitations	#19	Trustworthiness and limitations of findings	13,14
Other			
Conflicts of interest	#20	Potential sources of influence of perceived influence on study conduct and conclusions; how these were managed	15
Funding	#21	Sources of funding and other support; role of funders in data collection, interpretation and reporting	15

None The SRQR checklist is distributed with permission of Wolters Kluwer © 2014 by the Association of American Medical Colleges. This checklist can be completed online using https://www.goodreports.org/, a tool made by the EQUATOR Network in collaboration with Penelope.ai