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HOW DO HOSPITAL AND PRIMARY CARE DOCTORS ADDRESS HEART FAILURE PATIENTS' DISCLOSURES OF MEDICATION ADHERENCE PROBLEMS? An exploratory interaction-based observational cohort study

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HOW DO HOSPITAL AND PRIMARY CARE DOCTORS ADDRESS HEART FAILURE PATIENTS' DISCLOSURES OF MEDICATION ADHERENCE PROBLEMS? An exploratory interaction-based observational cohort study

ABSTRACT

Objectives: To investigate how doctors and self-managing older patients with heart failure (HF) discuss the patients' potential or ongoing medication adherence problems, and how such discussions evolve as patients transition from hospital to home, with particular focus on: (1) doctors' communicative actions aimed at addressing patient disclosures of adherence problems, and (2) patients' feedback indicating whether their doctors' supportive actions were acceptable to them.

Design: Exploratory interaction-based observational cohort study. Inductive microanalysis of authentic patient–doctor consultations, audio-recorded for each patient at: (1) first ward visit in hospital, (2) discharge visit from hospital, and (3) follow-up visit with general practitioner (GP).

Setting: Hospital and primary care, Norway (2022-2023)

Participants: 25 patients with HF (+65 years) and their attending doctors (23 hospital doctors, 25 GPs).

Results: The 25 patients with HF disclosed 23 practical adherence problems indicating risks of unintentional non-adherence and 39 perceptual problems indicating risks of intentional non-adherence. Patients disclosed up to four different problems to their doctors. Twelve patients repeated the same problem in more than one consultation. Doctors addressed 79% of patients' disclosures by: (1) exploring the scope of the problem, or (2) providing supportive actions to improve patient's ability or motivation to adhere. Doctors addressed patients' practical problems in 28 of 31 consultations (90%), and patients' perceptual problems in 37 of 51 consultations (73%). Unresolved problems included: (1) doctors addressed patients' disclosures, but patients signalled unacceptability to doctor's supportive actions (37%), and (2) doctors left disclosures unaddressed (21%).

Conclusion: Doctors were more likely to address patients' adherence problems associated with unintentional non-adherence risks than those associated with intentional non-adherence risks. Even when doctors attempted to address HF patients' medication adherence problems, half of the problems remained unresolved, most of the time because patients indicated that the doctors' suggestion to improve their situation was against their preference.

ARTICLE SUMMARY

Strengths and limitations of this study

- A detailed and comprehensive description of how often and how doctors respond to HF patients' disclosures indicating risks of medication non-adherence and, in turn, how patients respond to doctors' supportive actions.

- Analysis of authentic medical consultations at three key time points for each patient as they transition from hospital to home.
- Participant reactivity to the study situation may have led to more talk about medications and "best practice behaviour".
- Limited generalisability.

INTRODUCTION

Heart failure (HF) is a chronic, life-threatening condition prevalent among older people [1 2]. The global burden is high (estimated to affect 64 million people in 2023) and growing, due to an aging population[1]. The cornerstone of HF management to alleviate symptoms, reduce hospital admissions, and improve life expectancy is pharmacotherapy, using a combination of four to five medications [3-5]. Older patients with HF often have co-morbidities, leading to complex regimens with more than ten medications [6 7]. In this patient group, medication adherence is alarmingly low [8 9], thereby limiting therapeutic benefits[10]. Patients with HF fail to take their medications as prescribed for several reasons, including not understanding the prognosis and the purpose of their prescriptions, complex medication schedules, and experience of adverse effects [11-15]. Medication non-adherence can be intentional or unintentional[16 17], which emphasises the need for doctors to assess patients' ability and motivation to take their medications as prescribed[18]. Therefore, guidelines recommend that clinicians talk to patients about their medication use to ensure that any treatment decisions are based on current intake of medications[19 20].

Although good communication between patients and doctors improves medication adherence [21 22], little is known about how patients with HF and their doctors talk about adherence in medical consultations. Indeed, most studies analysing interactions have focused on other patient groups in outpatient settings[23-29]. More knowledge is needed about how doctors and patients with HF talk about adherence problems, and how doctors address such problems. Due to frequent hospital readmissions in this patient group, longitudinal studies are also needed to learn how conversations about adherence problems evolve as patients are cared for by different doctors in hospital and primary care. This knowledge can inform the development of communication skills training aimed at improving patient adherence.

In a previous study, we analysed real-life consultations from 25 patient trajectories and found that self-managing older patients with HF often disclose information to their doctors that signals potential or ongoing medication adherence problems at home[30]. The present study built on these identified problem disclosures and aimed to investigate the discussions that emerged from the disclosures. Data were the same authentic audio-recorded consultations and medical records collected at three time-points as patients transitioned from hospital to home. We recognised, defined, and counted our phenomena of interest: (1) doctors' communicative actions aimed at addressing patient disclosures of adherence problems, and (2) patients' feedback to the doctors indicating whether their supportive actions were acceptable to them.

METHODS

Overview of study design, participants, and data collection

This is an exploratory interaction-based observational cohort study. We followed 25 older patients with heart failure from their admission to the hospital to their return home and their first follow-up visit with their GP.

Recruitment of study participants (patients, hospital doctors, GPs) and data collection took place from February 2022 to February 2023. Patients in this study were admitted from home to the heart ward at Akershus University Hospital in Norway; they were diagnosed with HF, 65 years or older, and managing their own medications. Doctors in this study were either hospital doctors or GPs who attended to patients during the consultations selected for observation. See Table 1 for participant characteristics.

We observed and audio-recorded the following three patient-doctor consultations: (1) first heart ward visit in hospital, (2) discharge visit from hospital, and (3) first follow-up visit with GP. Table 1 provides details about the audio-recorded consultations. Audio-recordings were transcribed verbatim, and observation notes were added when relevant for interpretation of the speech (e.g., who was present, what happened during periods of silence, objects patients or doctors pointed to or showed each other). In addition, we collected information from medical records to extract HF history, discharge letters, and current prescriptions.

Additional information about the recruitment process and data collection is described in Frigaard et al[30]. We have used the STROBE cohort checklist[31] to report how the study was planned and conducted.

Table 1: Characteristics of participants and audio-recorded consultations

PATIENTS: Persons (+65 years) diagnosed with heart failure	**n=25**
Female, n (%)	8 (32%)
Age, median (min-max)	76 (67-90)
NYHA classification III, IV [1], n (%)	15 (60%), 7 (28%)
Ejection fraction [2], EF% below 35%	11 (44%)
Cognitive function [3], median score (min-max)	23 (16-30)
Diagnosed with HF more than 3 months ago [2], n (%)	15 (60%)
Diagnoses according to discharge letter, median (min-max)	3 (1-6)
Number of medications at hospital admission [2,4], median (min-max)	6 (0-14)
Number of medications at hospital discharge [2,4], median (min-max)	8 (4-16)
Patients with the following heart medications prescribed in their regimen [2,4], n (%)	Hospital admission / Hospital discharge
Angiotensin-Converting Enzyme (ACE)- inhibitor or Angiotensin Receptor-Neprilysin Inhibitor (ARNI)	19 (76%) / 24 (96%)
Antiarrhythmic medication	9 (36%) / 14 (56%)
Anticoagulant or antiplatelet	20 (80%) / 24 (96%)
Betablocker	15 (60%) / 22 (88%)
Diuretic for regular or intermittent use	13 (52%) / 16 (64%)
Mineralocorticoid Receptor Antagonist (MRA)	5 (20%)/ 15 (60%)
Sodium-glucose co-transporter-2 (SGLT-2) inhibitor	7 (28%)/ 19 (76%)

HMG-CoA reductase inhibitor (Statin)	20 (80%) / 17 (68%)
HOSPITAL DOCTORS	**n=23**
Female, n (%)	17 (74%)
Age, median (min-max)	31 (24-50)
Professional role as junior doctor, n (%)	22 (96%)
Years of work experience, median (min-max)	2.8 (0-17)
GENERAL PRACTITIONERS	**n=25**
Female, n (%)	8 (32%)
Age, median (min-max)	50 (35-71)
Professional role as junior doctor, n (%)	5 (20%)
Years of work experience, median (min.-max.)	16 (1-44)
AUDIO-RECORDED CONSULTATIONS	**n=74**
First heart ward visit in hospital (n=24), duration mean, (min - max)	14.7 minutes (6-23)
Discharge visit from hospital (n=25), duration mean, (min - max)	12.2 minutes (5-25)
First follow-up visit with GP (n=25), duration mean, (min - max)	22.8 minutes (10-44)
Days from hospital admission to hospital discharge visit, median (min-max)	6 (1-20)
Days between hospital discharge and follow-up visit with GP, median (min-max)	10 (2-43)

[1] New York Heart Association Functional Class[3], according to patients' medical records, [2] According to patients' medical records, [3]Cognitive function measured with MoCA assessment version 8.1 [32], median score (range), [4] Prescribed for regular use.

Data analysis

In the previous study, we defined and identified patients' Medication Adherence Disclosures in Clinical Interactions (MADICI)[30]. Of the 427 MADICI we identified in the audio-recorded consultations, we found that 235 (55%) included information signalling either a potential risk for non-adherence or outright non-adherence. In the current study, we used Microanalysis of Clinical Interactions (MCI) [33] inductively to explore whether and how doctors addressed these 235 problem disclosures, and how patients responded when doctors' addressing actions were suggestions for adherence support.

We made three initial assumptions: (1) patients may disclose problems about different topics (e.g., experiencing adverse effects AND forgetting to take medications) that they may reiterate in the same consultation or in other consultations, (2) different types of problems may trigger different addressing actions from doctors and should be analysed separately (e.g., actions doctors take to address how the patient is experiencing adverse side effects would be different than those to address the patient forgetting to take medications), and (3) doctor's addressing actions during consultations may be communicated to patients verbally or may be evident in their documented actions.

The analysis consisted of three steps. Step 1 was to delineate our unit of analysis, which was any discussion about a patient's specific adherence problem during one consultation, including anything relevant in doctor's written documents about that patient's treatment plan. To accomplish this, for each patient, we collected the previously-identified problem disclosures about the same adherence problem into topics (coined as redflag-topic). To exploit the study's longitudinal design, the patient's first disclosure about the specific problem in any consultation was the entry point for examining all consultations for discussions on that topic. We categorised redflag-topics informed by the

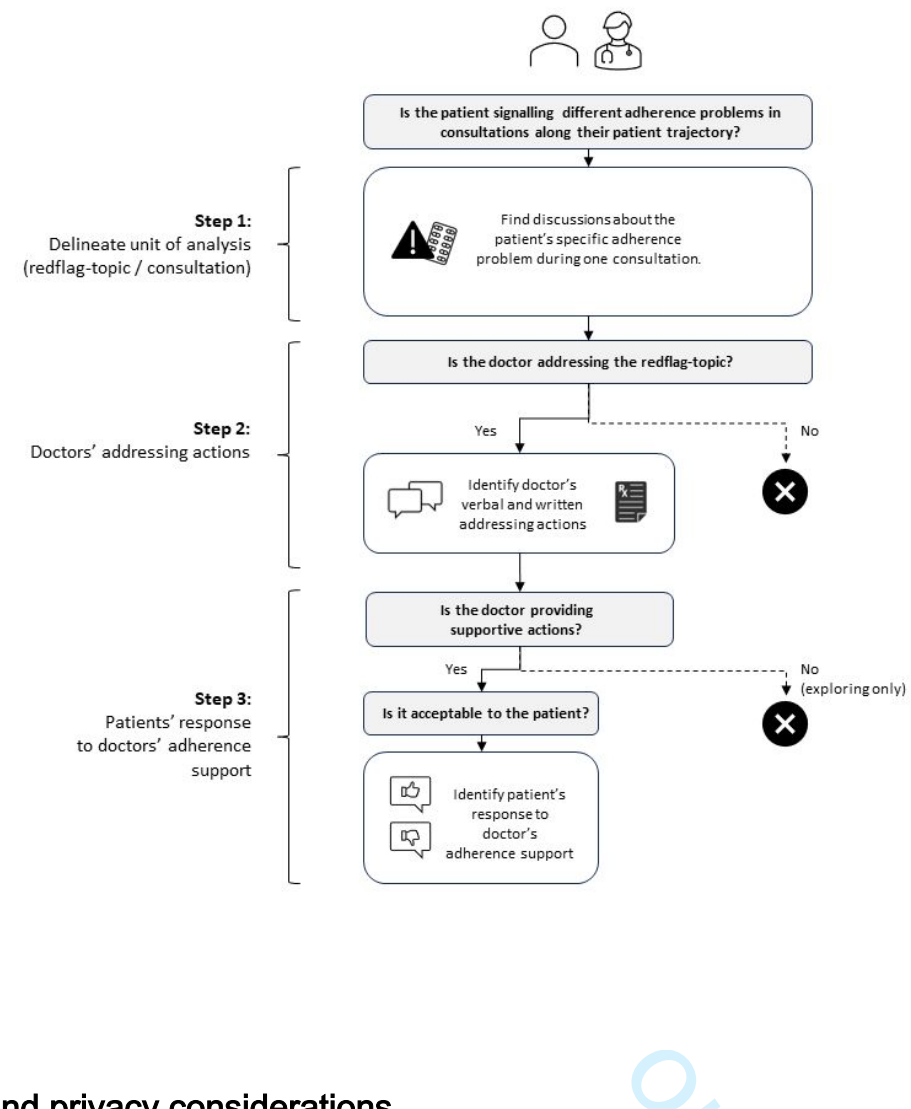
"Perceptions and Practicalities Approach" (PAPA) framework[18]. This framework takes a patient-oriented view to which barriers that must be altered to reduce patients' non-adherence risk.

In step 2, we developed operational definitions of doctors' communicative actions aimed at addressing the redflag-topic, and we noted when these actions included adherence support. Then we used a mixed effects logistic regression to investigate the potential differences between doctors addressing actions of redflag-topics that we categorised as either "perceptual" or "practical" in step 1. In the regression we used doctors' addressing action as the outcome variable, perceptual / practical as fixed effect, and consultation setting (first ward visit, discharge visit, GP-visit) as random effect. Analyses were performed using R (V. 4.4.2) in Rstudio (V. 2023.06.0).

In step 3, we developed operational definitions to identify what feedback doctors received from patients' responses to their adherence support, that is, whether patients indicated the adherence support was acceptable. The purpose of this step was to ascertain whether doctors' supportive actions were tailored to patients' preferences, which foreshadowed the likelihood of those actions to improve patients' adherence situation in the foreseeable future. In consultations where patients changed their preferences during the interaction, we made our analytical decision based on patients' final response. The coding manual with illustrative examples is available from the first author upon request.

We worked iteratively within each step and completed each step before starting the next. When developing operational definitions, we purposefully selected data from three newly diagnosed patients and three patients with known HF. As the definitions coalesced, we gradually expanded our analysis to the full dataset. Developing the definitions started with one researcher (CF) building a collection of examples demonstrating the phenomena of interest in specific, observable actions by listening to audio-recordings and investigating written materials. CF used transcripts in Microsoft Excel for reference and for recording all analytical decisions. Two researchers (JG and CF) met regularly to discuss the collection, resolve difficult cases by consensus, and refine definitions. Twice we presented examples and preliminary definitions for peer review to a multidisciplinary team of health communication researchers attending our MCI workshop. In addition, CF held individual meetings with one patient representative and several senior medical doctors (cardiology, acute care, general practice) to discuss relevance of our analytical approach for clinical practice.

Figure 1: Flowchart of analytical decisions



Ethical and privacy considerations

This study is funded by the Norwegian Research Council 31.08.2021 as part of the MAPINFOTRANS research project (MAPINFOTRANS). Following review of the project description, the Regional committee for medical and health research ethics concluded that MAPINFOTRANS was exempt from review (ref. 273688).

During the recruitment process, we verified that patients were competent to consent. All study participants signed an informed consent before taking part. Data used in this study has been collected, handled, and stored according to the procedures approved by the Data Protection Officer at Akershus University Hospital (ref 2021_146).

RESULTS

For each step of analysis, we present our definitions and examples developed during analysis as well as the quantitative results.

Topics of patients' disclosures of adherence problems

We identified 62 specific adherence problems (redflag-topics) in the 235 patient disclosures, which could refer to risks of unintentional non-adherence (n=23, 37%) or intentional non-adherence (n=39, 63%). Unintentional adherence risks related to patients' internal or external practical problems, and particularly to: (1) Healthcare systems related barriers, (2) Limited ability to organise intake of medications in use, and (3) Limited ability to recall or recognise medications in use. Intentional adherence risks related to patients' perceptions and included: (1) Negative stances, (2) Negative experiences, and (3) Concerns or worries. Of the 62 problem disclosures, 34 (52%) were only mentioned during GP-visits, 14 (23%) were mentioned in two of three consultations, and three problems (5%) were mentioned in all three consultations. Table 2 presents definitions, illustrative examples, and frequencies of topics of patients' problem disclosures.

Table 2 Topics of patients' disclosures of adherence problems

	Topic of adherence problem disclosure (number of patients disclosing this topic)	**Defined as present when patients' disclosed information about:**	**Examples**
Risk of unintentional non-adherence	**Health care systems related barrier** (n=4)	… external practical problems stemming from the healthcare system, e.g., prescribing errors, unavailability of medications on the market.	• Patient is worried she has used the wrong dose due to different information in the discharge letter and pharmacy label. • Patient reports being unable to fill prescription.
	Limited ability to organise intake of medications in use (n=8)	… forgetting to take medications or having limited ability or resources to organise their medications on a regular basis.	• Patient reports being unable to dispense own medications. • Patient forgets to take medications.
	Limited ability to recall or recognise medications in use (n=11)	… inability to recall or recognise which medications they are using during consultations.	• Patient is unable to report medication intake in accordance with prescribed regimen. • Patient reports he does not recognise the medication the doctor is talking about.
Risk of intentional non-adherence	**Negative stance to medications** (n=10)	… reduced motivation to take medications as prescribed (e.g., wants to change, discontinuing).	• Patient reports symptoms he thinks are adverse effects and wants to reduce medications he believes are unnecessary. • Patient has discontinued medication.
	Negative experience with medications (n=21)	… negative experiences after using medications (e.g., adverse drug reactions), but without mentioning a reduced motivation to adhere.	• Patient reports adverse effects. • Patient reports lack of effect of medication.
	Concerns or worries about medications (n=8)	… concerns or worries about benefits or preferences about their medications in use.	• Patient is worried about having (too) many medications. • Patient is unsure why she needs medication.

Patients disclosed up to four different adherence problems to their doctors along their patient trajectory; seven patients disclosed one problem, five patients two problems, eight patients three problems and five patients four problems. Analysing three key consultations along 25 patient trajectories, we identified that the 62 specific adherence problems appeared in consultations 82 times (recall that the unit of analysis was any discussion about a patient's specific adherence problem during one consultation).

Doctors' actions in response to patients' problem disclosures

We analysed doctors' verbal and written communicative actions to address patients' problem disclosures, just after the disclosure or later in the consultation, that could foreseeably change the patient's situation. These actions were broadly categorised into "addressing" or "not addressing" the patients' problem disclosure (redflag-topic).

Doctors addressing actions

We defined ***addressing*** as any communicative action that indicate that the doctor is orienting to the patient disclosure by: (1) Exploring the scope of the problem (e.g., seeking more information about the patient's perception or adherence behaviour), AND/OR (2) Providing supportive actions to improve the patient's ability or motivation to adhere (e.g., providing information, prompting, suggesting alternatives to manage the situation, co-reasoning about options, deciding to change prescriptions, ordering professional services).

We observed that the timing of doctor's responses to patients' problem disclosures varied greatly. Sometimes doctors would respond immediately, while other times they waited until the patient repeated it. Sometimes doctors immediately aligned with the patient's problem but reintroduced the topic later to discuss how to handle it. We observed some cases where the doctor simply changed the patient's prescription in response to the patient's disclosure without discussing it.

As an illustrative example, Table 3 presents an excerpt from an interaction where the patient discloses an adherence problem to the GP, who addressed it. In this example, the patient reports forgetting to take medications (line t50-F-4), thereby signalling to the doctor an ongoing adherence problem. After an immediate response to clarify that "them" refers to "medications", the doctor proceeds to address the disclosure by (1) seeking more information about the scope of the problem (line t50-F-7) AND (2) providing several types of supportive actions. These include ordering professional services, using alarms and daily routines to reduce the risk of forgetting (lines t50-F-9, t50-F-15), co-reasoning about these alternatives (lines t50-F-19, t50-F-21) and suggesting in the end of the consultation to "wait and see" (line t50-F-23). The doctor provided no additional adherence support to the patient in writing. These addressing actions revealed the scope of patient's non-adherence behaviour and provided the patient (and companion) with information that there are many options available to them to improve the situation.

Table 3 Illustrative example of an addressed disclosure

Redflag-topic 50: Patient forgets to take medications. Indicated adherence barrier: Limited ability to organise intake of medications in use (Practical problem, risk of unintentional non-adherence)			**Coding notes**
Line	**Speaker**	**FIRST FOLLOW-UP WITH GP**	
t50-F-1	Doctor (GP)	Do you feel it goes well to manage your own medications?	
t50-F-2	Patient	Yes…yes I believe so. I could have brought with me the dosette box here now to show you how I have put them in, but it is 5…6 medications that I use. Well, one thing that I am very bad at is to remember the names of those medications. So that tells me nothing.	
t50-F-3	Doctor (GP)	No, and it is not so easy because unfortunately it is so that it can be written one name on the medication and then you get something…then it is the generic name that they hand out from the pharmacy and then it gets…	

t50-F-4	Patient	Yes, yes, so…but then I read on the label, and then I lay out if it is morning and evening, so I put them out directly and then I take the next box. But then I have to admit that it happens that I forget to take them.	(Patient's first disclosure about this specific adherence problem in the consultation)
t50-F-5	Doctor (GP)	Medications?	
t50-F-6	Patient	Yes. And it can be both morning and evening.	
t50-F-7	Doctor (GP)	**But how often does that happen?**	Doctor seeks additional information about patients' adherence behaviour and scope of the problem
t50-F-8	Patient	It is probably once a week I have one or another like … that I go "damn, now I forgot it yesterday"	
t50-F-9	Doctor (GP)	**Because that is what potentially could be the reason why we should get home care nurses to perhaps follow that up a bit more,** if you forget it too often. Of course, once in a while is no crisis, but if it is a regular occurrence that it happens…. **But could you have an alarm on your watch that made a "pip-sound"?**	Doctor provides adherence support: Suggests (1) ordering professional services to take responsibility for management of medications, and (2) using alarms to alert medication intake
t50-F-10	Patient	I have been given that.	
t50-F-11	Doctor (GP)	**But one that gives a sound at regular times when you should take your medication.**	Doctor continues to suggest using alarms
t50-F-12	Patient	Yes… [patient sounds pensive]	(Interpreted as a listening response)
t50-F-13	Doctor (GP)	**It is possible to enter regular alarms if that could be easier.**	Doctor continues to suggest using alarms
t50-F-14	Patient	Yes.. yes…[patient sounds pensive]	(Interpreted as a listening response)
t50-F-15	Doctor (GP)	**Or that you have a routine that you take them when you brush your teeth for example, right?**	Doctor provides adherence support (3) suggests using daily routines to support adherence.
t50-F-16	Patient	Yes, that is morning and evening	
t50-F-17	Doctor (GP)	Mm. It is about remembering it.	
t50-F-18	Companion to patient	It is lying in the middle of his kitchen table so… I suppose we could keep an eye on it too and then we can discuss what we think. Because we are there a lot and…	Companion suggests other options in response to patient's hesitation to doctors suggestions
t50-F-19	Doctor (GP)	**Yes. No, because I understand that for *patient name* too, you think that…it is probably good to manage and keep track of it yourself as such**	Co-reasoning about adherence support.
t50-F-20	Patient	Yes yes yes	
t50-F-21	Doctor (GP)	**And if that works then that is fine. But if it becomes that too often you forget to take it then it is …**	Co-reasoning about adherence support.
t50-F-22	Patient	Pft…I forget it once a week I suppose	
t50-F-23	Doctor (GP)	**But why don't you keep an eye on it, and then we can stay in touch.** [closing remarks]	Doctor suggests to "wait and see". WRITTEN ADHERENCE SUPPORT: No additional support provided.
NOTE: We use ***italics*** to signal where we have replaced names and medication brands for anonymity and universal comprehension. Information required for comprehension is provided in [square brackets]. Original transcripts in Norwegian with translation to English are provided in online supplementary materials.			

We defined that patients' problem disclosures remained ***unaddressed*** when doctors' actions were limited to utterances orienting away from the adherence problem by: (1) neutral, non-committal responses (e.g., listening responses, reformulating to clarify), (2) pursuing biomedical issues (e.g., symptoms, diagnostic tests), (3) changing the topic, and (4) emotional and cognitive alignment. In

the illustrative example below, from the first ward visit in hospital, the patient discloses how the effect of bumetanide limits his daily activities. This disclosure signals that the patient may have a low motivation to use this medication as prescribed. Here, the doctor immediately provides emotional support ("no that is a bit of a nuisance") before pursuing a biomedical issue about the medication ("Which colour is your urine, is it light or dark"):

> Doctor: But what is it like at home?
> Patient: Yes it is… straight after I have taken those pills [bumetanide prescribed for use at home] then I have to go to the toilet the next 3-4 hours. But it does not come … it is not a lot though. But I must go to the toilet, I cannot plan any activities as such.
> Doctor: No that is a bit of a nuisance.
> Patient: Yes, it is. But that's how it is.
> Doctor: Which colour is your urine, is it light or dark?

The patient brought up the same problem during the discharge visit when another doctor presented him with an updated medication list, still including bumetanide. Again, the doctor did not address it. Full transcript with coding notes for both consultations are available in online supplementary materials.

Frequencies of doctors' addressing actions

Table 4 presents whether and how doctors addressed patients' problem disclosures in 82 consultations, organised by topic and consultation setting.

We identified 31 consultations during which patients disclosed problems associated with an unintentional non-adherence risk (i.e., patients' practical problems). In 28 of these 31 consultations (90%), doctors addressed the patient's problem disclosure either by exploring it further (21 of 28 consultations), providing supportive actions (27 of 28 consultations), or a combination of both. The proportion of doctors who addressed patients' disclosures of practical problems was high in all settings.

We identified 51 consultations during which patients disclosed problems associated with an intentional non-adherence risk (i.e., patients' negative perceptions). In 37 of these consultations (73%), doctors addressed the patient's problem disclosure either by exploring it further (23 of 37 consultations), providing supportive actions (36 of 37 consultations), or a combination of both. We observed differences between settings: Doctors addressed patients' negative perceptions disclosed during the first ward visits 3 of 8 times, 7 of 11 times during discharge visits, and 27 of 32 times during GP-visits.

We observed differences in how often doctors addressed patients' problem disclosures indicating different topics and investigated these further. Using a mixed effects logistic regression to estimate potential differences of doctors addressing patients' disclosures signalling practical or perceptive adherence barriers, we calculated the odds ratio to be 4.79, with a 95% confidence interval of (1.25 to 25.83). This result indicates that it is nearly 5 times higher odds for doctors to address patients' practical adherence problems (e.g., reduced ability to organise intake) to their perceptual problems (e.g., negative experiences).

Table 4 Frequency of doctors' addressing actions and patients' feedback

Topic of patients' adherence problem disclosure	PATIENTS ACTIONS	DOCTORS COMMUNICATIVE ACTIONS IN RESPONSE TO PATIENTS' DISLOSURES			PATIENTS ACTIONS
	Visits with problem disclosed	Addressed	Addressed by exploring further [a]	Addressed by providing supporitive actions [b]	Signalled unacceptability to adherence support [c]
FIRST WARD VISIT (n=18):					
Health care systems related barrier	0	n/a	n/a	n/a	n/a
Limited ability to organise intake of medications in use	3	2	2	1	1
Limited ability to recall or recognise medications in use	7	6	6	6	3
Negative stance to medications	2	1	1	1	1
Negative experience with medications	6	2	1	2	2
Concerns or worries about medications	0	n/a	n/a	n/a	n/a
DISCHARGE VISIT (n= 16):					
Health care systems related barrier	0	n/a	n/a	n/a	n/a
Limited ability to organise intake of medications in use	3	3	2	3	1
Limited ability to recall or recognise medications in use	2	2	0	2	0
Negative stance to medications	5	2	1	2	2
Negative experience with medications	5	4	2	4	2
Concerns or worries about medications	1	1	1	1	0
FOLLOW-UP VISIT WITH GP (n= 48):					
Health care systems related barrier	4	4	4	4	0
Limited ability to organise intake of medications in use	6	5	4	5	3
Limited ability to recall or recognise medications in use	6	6	3	6	2
Negative stance to medications	7	6	5	5	2
Negative experience with medications	18	16	11	16	4
Concerns or worries about medications	7	5	1	5	1
Overall	**82**	**65 of 82 (79%)**	**44 of 65 (68%)**	**63 of 65 (97%)**	**24 of 65 (37%)**
SUB-ANALYSIS for the 12 patients who disclosed the same problem in more than one consultation					
Limited ability to organise intake of medications in use	7	7	6	6	3
Limited ability to recall or recognise medications in use	7	7	5	7	2
Negative stance to medications	7	6	5	6	5
Negative experience with medications	16	10	7	10	4

[a] Doctor exploring the scope of the problem further, [b] Doctor providing verbal or written supportive actions to improve patient's ability or motivation to adhere, [c] Patient utterance including information signalling doctors' adherence supportive action was against their own preferences or indicating it was unlikely to change their situation in the foreseeable future.

Patient responses to doctors' supportive actions

We observed that patient's reactions to doctors' supportive actions varied greatly. While there were some clear indications of acceptance and some outright rejections, sometimes patients would indicate that they preferred another solution, for example by co-reasoning with the doctor about alternatives or bringing forward ideas of their own. Sometimes there was just silence, which could either indicate the patient responded only with visible action or did not respond at all.

Based on our observations, we decided to identify patient utterances signalling unacceptability to doctors' adherence support. Our rationale was two-fold: (1) working with audio-recordings we were missing co-speech gestures and facial expressions thereby making it difficult to interpret patients' minimal verbal responses (e.g., "mm", "yes", "no"), and (2) communication-based research has shown that there is a "normative obligation" for patients to express agreement[27] rather than disagreement to doctors suggestions, thereby making non-acceptability a more precise indicator for how well doctors' actions met patients' preferences.

Patient acceptability

We defined ***unacceptability*** as patient utterances that included information that the doctor's supportive action was against their own preferences or indicated that it was unlikely to change their situation in the foreseeable future. We recognised patient unacceptability when (1) the patient response indicated prior knowledge (e.g., information given did not fill a knowledge gap), (2) the patient did not seem convinced by the provided information (e.g., gave counter arguments, alternative hypotheses), (3) the patient suggested other supportive measures for the doctor's consideration (e.g., dose reduction, deprescribing), (4) the patient preferred to maintain status quo (e.g., wait and see), (5) the patient did not reject the supportive action outright, but shared information that indicated a negative stance or negative experience (e.g., told a history of a past experience that did not work), or (6) when the doctor's prompts were ineffective to reveal reliable information from the patient about their medication use.

Table 5 provides illustrative examples of how we recognised patient's signals of unacceptability to doctor's supportive action. The table presents problems that were addressed by doctors, with examples of doctors' supportive actions (not exhaustive) that the disclosures elicited.

Table 5 Patients signals of unacceptability to doctor's supportive action

TOPIC OF ADHERENCE PROBLEM	Doctors' supportive action	Doctors' utterance	Patient response	Coding notes
Redflag-topic 19: Patient is unable to report medications in use during medication reconciliation, hospital has misplaced medication list given by patient to ambulance personnel.	Provides prompts to trigger memory of medication names and number of daily medications.	"But then it also says that that you have used a tablet called *spironolactone*, - spironolactone. Can you remember it?"	"No I don't remember that, you understand."	Ineffective prompts: the patient is unable to provide reliable information about medication use.
		"It also says here [doctors notes] that you use one called Lerkandidpine."	"I think that sounds…the name sounds familiar."	
		"Do you remember how many blood pressure tablets you take in total?"	"Isn't it three I think. Or are there more?"	
		"It depends a bit, because the one called *spironolactone* also helps with blood pressure. So if you count it, then you have 4 tablets on that list here then."	"In total, I guess…it's 6 or 7 tablets every morning. But you know what I remember…I must check it a little bit myself too."	
Redflag-topic 47: Patient reports being unable to keep overview and dispense own medications.	Discharge letter.	[Gives discharge letter to patient]	[Reads discharge letter] "I do not understand any of this." "No, the home-nurse services must take care of this."	The patient provides counter-arguments and suggests other supportive measures for the doctor's consideration.
Redflag-topic 4: Patient reports struggling to keep own medication list updated and worries about taking medication incorrectly as a consequence.	Advises patient to memorise all medications in use and continue organising medications as before.	"Yes, it often does. There are a lot of people who have high blood pressure and diabetes, they end up somewhere between 10-12 medications. Also quite healthy people who are still working. But it is always a good idea to try to remember it yourself, to remember the names. Because suddenly you end up in a situation…You have worked very hard in your professional life, so you probably remember technical things well, you have a good memory."	"I think I remember the whole list of medications."	The patient does not reject the supportive measure outright, but the combination of hedging his response ("I think I remember") after disclosing information (via red-flag topic) that he feels a loss in personal control that relies on his cognitive abilities indicates that doctor's advice is unlikely to improve the situation.

Redflag-topic 5: Patient is worried about having (too) many medications.	Provides information about necessity of medications and indicates potential reduction in number of medications if symptoms change.	"So a lot of it is…at least three of the medications are to bring your pulse down, your heart rate. So it is quite possible that that they might be removed. So there may be less medications."	"Yes it could be…maybe I can get new medications from the hospital too now." (patient repeats being worried about too many medications later in the consultation.)	The patient did not seem convinced by information provided.
Redflag-topic 24: Patient does not understand need for medication and experiences side-effects of medication.	Provides information about benefits and necessity of medications.	"It is because you have known coronary disease from before. So with you we would like to have a very strict target on your cholesterol."	"I have understood that."	The patient response indicated prior knowledge.
		"I noticed your cholesterol was at 1.2, that is the dangerous cholesterol, LDL-cholesterol. That is good. That is actually very low. But with you who have a known coronary disease, and who has heart failure because of that, then the target is that you should be below 1.4."	"I am below 1.4."	The patient did not seem convinced by information provided.
	Indicates possibility to reduce dose in the future.	"That you are. But it can be useful for you to be aware that if you should notice side-effects of that *atorvastatin* that you use, then it can be possible to reduce the dose a bit now that you have started with *amiodarone*. We have not made any changes now, but.."	"Yes. No, but really when I'm thinking… and a little less, because it drains a lot of energy." "I have no energy. You have to fight for everything, to manage to do something. And I think it is exhausting."	The patient provides counter-arguments, emphasising current adverse effects.
Redflag-topic 16: Patient expresses negative stance to new dosing schedule and later discloses omitting doses.	Provides information about benefits and necessity of medication.	"I understand that. But the problem is that if you do not use it [bumetanide] then your heart begins to fail a little more and more."	"Yes, yes, if I am home then its fine, right. But if I am going long distances in the car and such, then I will have to push it a bit."	The patient provides counter-arguments and suggests other supportive measures for the doctor's consideration.

Frequency of patients' signals of unacceptability

Table 4 presents patients' feedback in response to their doctors' suggested adherence support. Near 40% of patients responded with negative feedback to their doctors' suggestions of adherence

support. Most problems were discussed during the GP-visit, and our results indicate that GPs' supportive measures were more acceptable to patients than those suggested by hospital doctors.

Patients disclosed topics about healthcare related adherence barriers only to their GPs, whose supportive actions were always acceptable to patients.

Adherence problems repeated along patient trajectories

So far, all results have been based on single consultations, without taking the longitudinal design into account. Now we will present results for the patients who disclosed the same adherence problem in more than one consultation as they transitioned from hospital to home.

Near 50% of HF patients disclosed the same (potential) problem to their attending doctor in different settings. Most of these (n=10) had known HF. They contributed 17 topics in total, about these non-adherence risks: negative experience with medications (n=8), negative stance to medications (n=3), limited ability to recall or recognise medications in use (n=3), and limited ability to organise intake of medications (n=3). Two patients disclosed the same problem in all three consultations. Table 4 also presents a sub-analysis of the topics these 12 patients discussed in consultations.

Ten of the 12 patients disclosed a perceptual problem, thereby indicating an intentional non-adherence risk. For two of these patients, none of their doctors addressed the problem. Of the remaining eight, four patients experienced that all doctors addressed their disclosures, and they accepted the doctors' supportive actions discussed in the GP-visit.

Six of the 12 patients disclosed a practical problem, thereby indicating risks of unintentional non-adherence. Doctors always addressed these patients' problem disclosures. Patients who received help to recall which medications they were using, always accepted their doctors' supportive actions (usually prompts about names and doses). In contrast, patients who struggled with keeping overview and organising their medications, never accepted suggestions provided at the GP-visit after returning home from the hospital.

DISCUSSION

This is the first study to investigate how doctors and self-managing, older patients with HF discuss patients' disclosures of medication adherence problems in real life, and how such discussions evolve as patients talk to different doctors. This study offers an "inside view" of how doctors use their communication skills to address patients' potential or ongoing medication adherence problems, and how in turn, patients respond to their supportive actions. Given the persistently low medication adherence rates in this patient population, a better understanding of this information exchange in practice is valuable to inform practitioners, educators, and researchers who work to improve adherence to HF treatment.

The findings showed that near 50% of HF patients disclosed the same (potential) problem to their attending doctor in different settings, suggesting that it was an ongoing or recurring issue. Nearly all of them reported problems associated with intentional non-adherence (perceptual issues), while 50% of them reported problems associated with unintentional non-adherence (practical issues). These findings are somewhat surprising given the fact that unintentional non-adherence is considered more common [17 34]. One explanation is that due to our recruitment process, patients

were more self-efficacious than average HF patients, thereby having the ability to manage their medications well. Another possible explanation for this finding might be patients underreporting problems since they may prefer to withhold information about their intentional "medical misdeeds"[25 35]. We observed that doctors' questions were mainly focused on reconciliation of which medications the patient had been prescribed by other doctors, often failing to follow up with questions about how patients were managing to use them at home (see Table 3 for a good example of eliciting the latter). This observation may be due to time-constraints or unawareness of the distinction between the two, but it can also be due to insufficient training in how to elicit information about patients' adherence behaviour. Health communication research recommends doctors to "ask-tell-ask" [15], using open, non-judgemental questions about patients ability to manage their medication intake [36-38], adding explicit questions for precise information about omitted doses [39]. This approach also gives doctors the possibility to discover and resolve patients' misconceptions[40].

A second key finding was that most adherence talks took place at the GP-visit. Possible explanations for this observation include: (1) junior hospital doctors may prefer to defer challenging discussions (e.g., emotional and time-consuming talks) to the patients' GP who has an established relationship with the patient [11 41 42], (2) patients may prefer to discuss problems with their longs-standing doctors [12 30 43 44], and (3) before patients can assess their ability and motivation to adhere to their medications and formulate "complaints", they need time to experience what it is like to use them.

A third key finding was that doctors addressed most patients' disclosures of medication adherence problems, sometimes by exploring the problem further but most often by providing supportive actions. This finding indicates that doctors are sensitive to, and act on such disclosures, which aligns with previous studies reporting that doctors feel responsible for addressing underlying factors for non-adherence [23 39]. However, we found that when doctors addressed patients' disclosures, they were five times more likely to handle problems associated with unintentional non-adherence (e.g., signals of forgetting doses, inability to manage complex regimens, prescription errors) than perceptual problems associated with intentional non-adherence (e.g., signals of negative beliefs, low motivation to take medications). When asked, non-adherent HF patients who became adherent, decided to do so after understanding how poor their prognosis was without medicatons[12], thereby indicating the pivotal role prognostic talk might have on intentional non-adherence. Though prognostic talk was outside the scope of this study, our impression was that doctors avoided prognostic talk, at least in their responses to patient disclosures, they instead emphasised (biomedical) benefits and necessity of using troublesome medications when patients signalled low motivation to use them (See redflag-topic 5,16 and 24 in Table 5 for examples). Previous studies showed that doctors avoid prognostic talk with HF patients when possible[11], which is echoed by patients [12-14 45]. Another explanation may be that doctors are unsure how to handle situations where patients signal that their preferences conflict with HF guidelines. Accommodating patients' wishes by deviating from the best documented regimen for prolonging patients' lives and reduce hospital admissions [3 4] is likely to challenge doctors' professional standards as well as leave them vulnerable to formal complaints.

Finally, we found that one in two medication adherence problems patients disclosed remained unresolved. Often it was as if patients and doctors talked past each other. Problems remained unresolved due to: (1) doctors did not address patients' adherence problem disclosures, or (2) when doctors addressed it, patients signalled that it was against their preferences or unlikely to change their situation. There are many salient reasons for why doctors left patients' disclosures unaddressed, including missing the (significance of the) information, downplaying adherence talk given the institutional setting[46], in addition to those previously mentioned. In this study, we found

that near 40% of patients indicated that doctors' supportive actions were unacceptable to them, leaving their risk of non-adherence unchanged (Table 3 and Table 5 provide illustrative examples). Patients using their agency to negotiate treatment decisions have been studied in other settings [27 47 48], indicating similar levels of unacceptability to doctors recommendations[49]. The conceptual core of "medication adherence" builds on respect for patient autonomy and patients' agreement to doctors' recommended treatment plan[37 50]. Therefore, doctors need training and support to develop skills to negotiate and tailor treatment recommendations, both of which are difficult to master in practice[51-53]. To conclude, we propose three areas to improve adherence talk: (1) Ensure that all doctors have access to patients' current prescriptions in one national database, so that doctors can spend less time reconciliating what is prescribed and more time assessing patients' ability and motivation to adhere, (2) train doctors in patient oriented decision making regarding medications and how to talk to HF patients about their prognosis, and (3) provide doctors with a "toolbox" for how to negotiate and tailor HF treatments to patient preferences.

Strengths and limitations

The main strengths of this study include: (1) Our findings are observed in authentic consultations, at three selected timepoints when guidelines recommend doctors to reconciliate patients' prescriptions and talk about their medication adherence[19 20]. To explore qualitative aspects of adherence talk, a sample of 74 audio-recorded consultations and medical records from 25 patient trajectories have high information power. [54] (2) Access to patients' medical records allowed us to discover doctors' written adherence support that was not evident from the dialogue. (3) To ensure consistency in our coding, ensure transparency, and encourage reproducibility[55], we have developed a detailed coding book with examples of our analytical decisions which is available on request.

Main limitations of this study include: (1) We recruited patients from one hospital ward, limiting the generalisability of our findings. Due to our inclusion/exclusion criteria and recruitment process, patients may be less frail than the average HF patient on the heart ward (MAPINFOTRANS included an extended home interview, and several eligible patients indicated they felt too poorly to receive visitors when declining study participation). (2) The study situation, especially due to an observer recording the consultation, may have led to more talk about medications and "best practice behaviour" from patient and doctor.[56] (3) The doctor's supportive actions were not vetted by other clinicians for their appropriateness in the given situation.

CONCLUSION

This study set out to investigate how doctors respond to patients' medication disclosures indicating a potential or ongoing adherence problem, and in turn, how patients respond to the doctors' supportive actions that their disclosures elicited. We found that doctors are more likely to address patients' adherence problems associated with unintentional non-adherence risks than those associated with intentional non-adherence risks. Even when doctors attempted to address HF patients' medication adherence problems, half of the problems remained unresolved, most of the time because patients indicated that the doctors' suggestions was against their preference.

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Author contributions

PG, HS, JG, and JM conceptualised the MAPINFOTRANS study and applied for funding and ethics approval. HB, CF, and TBS conducted the data collection. CF and JG conceptualised the present study, analysed the data, and developed the codebook. TW performed all statistical analyses. CF drafted the manuscript with major contributions to the writing, review and editing from JG, PG, TW, and JM. All authors have read and approved the final manuscript submitted for publication. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

The guarantor (CF) affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned have been explained.

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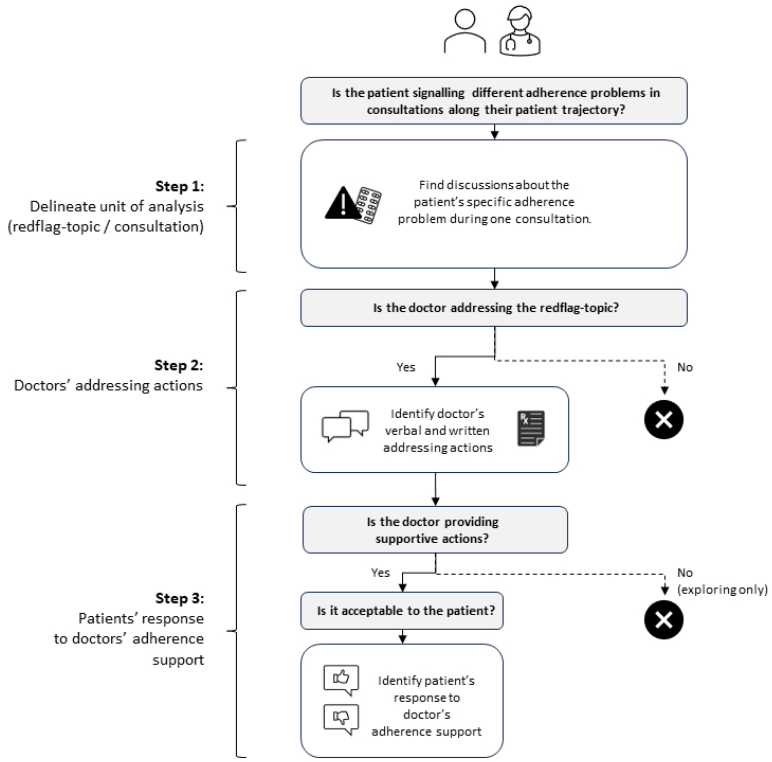

Figure 1 Flowchart of analytical decisions

250x250mm (96 x 96 DPI)

SUPPLEMENTARY MATERIALS

HOW DO HOSPITAL AND PRIMARY CARE DOCTORS ADDRESS HEART FAILURE PATIENTS' DISCLOSURES OF MEDICATION ADHERENCE PROBLEMS? An exploratory interaction-based observational cohort study

S1 NO/ENG Translation of illustrative example of addressed redflag-topic

Redflag-topic 50: Patient forgets to take medications. Indicated adherence barrier: Limited ability to organise intake of medications in use (Practical problem, risk of unintentional non-adherence)			**Coding notes**
Line	**Speaker**	**FIRST FOLLOW-UP WITH GP**	
t50-F-1	Doctor (GP)	Føler du at det går greit å styre medisinene selv da? **Do you feel it goes well to manage your own medications?**	
t50-F-2	Patient	Ja.... Ja jeg synes det altså. Jeg kunne jo tatt med medisinesken hit nå og vist deg hvordan jeg har lagt inn det, men… er det 5… 6 medisiner jeg bruker. Altså en ting jeg er veldig dårlig på det er å huske navnene på de medisinene. Så det sier meg ingen ting. **Yes…yes I believe so. I could have brought with me the dosette box here now to show you how I have put them in, but it is 5…6 medications that I use. Well, one thing that I am very bad at is to remember the names of those medications. So that tells me nothing.**	
t50-F-3	Doctor (GP)	Nei og det er ikke så lett vet du fordi at dessverre så er det jo sånn at det kan stå et navn på medisinen og så får du noe… så er det virkestoffet som de gir ut på apoteket og så blir det… **No, and it is not so easy because unfortunately it is so that it can be written one name on the medication and then you get something…then it is the generic name that they hand out from the pharmacy and then it gets…**	
t50-F-4	Patient	Ja, ja, så… men da leser jeg på etiketten, og så legger jeg ut hvis det er morgen og kveld da, så legger jeg ut direkte og så tar jeg neste boks. Men så må jeg innrømme at det hender jeg glemmer å ta de. **Yes, yes, so…but then I read on the label, and then I lay out if it is morning and evening, so I put them out directly and then I take the next box. But then I have to admit that it happens that I forget to take them.**	(Patient's first disclosure about this specific adherence problem in the consultation)
t50-F-5	Doctor (GP)	Medisinene? **Medications?**	
t50-F-6	Patient	Ja. Og det kan være både morgen og kveld. **Yes. And it can be both morning and evening.**	
t50-F-7	Doctor (GP)	Men hvor ofte skjer det da? **But how often does that happen?**	Doctor seeks additional information about patients' adherence behaviour and scope of the problem
t50-F-8	Patient	Det er nok en gang i uka jeg har en eller annen sånn,... at jeg "å fankern nå glemte jeg den i går". **It is probably once a week I have one or another like … that I go "damn, now I forgot it yesterday"**	
t50-F-9	Doctor (GP)	For det er jo det som eventuelt skulle være grunnen til at vi skulle sette hjemmesykepleien til å liksom følge opp det	Doctor provides adherence support: Suggests (1) ordering

		litt mer, hvis du glemmer det for ofte da. Klart, en sjelden gang er det ikke noe krise, men hvis det er liksom gjennomgående at det skjer… Men kunne du ha hatt en alarm på klokka di da som peip? **Because that is what potentially could be the reason why we should get home care nurses to perhaps follow that up a bit more, if you forget it too often. Of course, once in a while is no crisis, but if it is a regular occurrence that it happens…. But could you have an alarm on your watch that made a "pip-sound"?**	professional services to take responsibility for management of medications, and (2) using alarms to alert medication intake
t50-F-10	Patient	Det har jeg fått da. **I have been given that.**	
t50-F-11	Doctor (GP)	Men som også som piper til faste tider når du skal ta medisinen din. **But one that gives a sound at regular times when you should take your medication.**	Doctor continues to suggest using alarms
t50-F-12	Patient	Ja…[høres tankefull ut] Yes…[sounds pensive]	
t50-F-13	Doctor (GP)	Det går an å legge inn sånne faste alarmer da, hvis det kunne vært enklere. **It is possible to enter regular alarms if that could be easier.**	Doctor continues to suggest using alarms
t50-F-14	Patient	Ja…ja..[høres tankefull ut] **Yes.. yes…**[sounds pensive]	
t50-F-15	Doctor (GP)	Eller at du har en rutine på at du tar de i forbindelse med tannpussen for eksempel, ikke sant? **Or that you have a routine that you take them when you brush your teeth for example, right?**	Doctor provides adherence support (3) suggests using daily routines to support adherence.
t50-F-16	Patient	Ja, det er morgen og kveld. **Yes, that is morning and evening**	
t50-F-17	Doctor (GP)	Mm. Det er det å huske det. **Mm. It is about remembering it.**	
t50-F-18	Companion to patient	Det ligger jo midt på kjøkkenbenken hans liksom, så… Vi kan vel følge med lite grann mer på det og så kan vi diskutere litt hva vi kanskje synes. For vi er jo mye der og… **It is lying in the middle of his kitchen table so… I suppose we could keep an eye on it too and then we can discuss what we think. Because we are there a lot and…**	
t50-F-19	Doctor (GP)	Ja. Nei for jeg skjønner jo det for *pasientens navn* også, du synes jo… det er jo sikkert godt å kunne styre og holde på det selv liksom. **Yes. No, because I understand that for *patient name* too, you think that…it is probably good to manage and keep track of it yourself as such**	Co-reasoning about adherence support.
t50-F-20	Patient	Ja ja ja **Yes yes yes**	
t50-F-21	Doctor (GP)	Og hvis det fungerer så er jo det greit. Men hvis det blir sånn at det blir for ofte at du glemmer det så er det jo… **And if that works then that is fine. But if it becomes that too often you forget to take it then it is …**	Co-reasoning about adherence support.
t50-F-22	Patient	Pfh..Jeg glemmer det vel en gang i uka. **Pft…I forget it once a week I suppose**	
t50-F-23	Doctor (GP)	Men kan ikke dere også følge litt med, og så kan vi jo holde litt kontakten. **But why don't you keep an eye on it, and then we can stay in touch.** [closing remarks]	Doctor suggests to "wait and see". WRITTEN ADHERENCE SUPPORT: No additional support provided.

S2 NO/ENG Translation of illustrative example of unaddressed redflag-topic

In redflag-topic 2, the patient discloses a negative adverse effect when taking bumetanide, a diuretic medication, at home. The patient disclosed the topic in two separate consultations to different doctors (t2-W-8, t2-D-1). Investigating the first ward visit, we observe that the doctor provides emotional support (t2-W-9) before pursuing a biomedical issue about the medication (t2-W-11, t2-W-13). According to our definitions, the redflag-topic is unaddressed since the doctor did not explore the scope of the problem and supportive actions were limited to emotional alignment. We found the same outcome analysing the discharge visit; doctor's responses were limited to emotional (t2-D-2) and cognitive alignment (t2-D-4), before changing the topic (t2-D-6).

Redflag-TOPIC 2: Patient reports medication limiting daily activities. Indicated adherence barrier: Negative experience			**Coding notes**
Line	**Speaker**	**FIRST WARD VISIT IN HOSPITAL**	
t2-W-1	Doctor (HD)	Og så får du også litt sånn vanndrivende medisiner for å tisse ut noe av det vannet som du har ekstra. **And then you also got diuretic medications to pee out some of the water that you have extra**	
t2-W-2	**Patient**	Veldig lite tissing egentlig da. **Very little peeing really**	
t2-W-3	Doctor (HD)	Det er det? **It is?**	
t2-W-4	Patient	Ja **Yes**	
t2-W-5	Doctor (HD)	Du har ikke tisset noe ekstra siden du kom inn hit? **You have not peed more since you were admitted to the hospital?**	
t2-W-6	Patient	Nei jeg synes ikke det er noe ekstra akkurat nei. **No I don't think so no**	
t2-W-7	Doctor (HD)	Men hvordan er det hjemme? **But what is it like at home?**	
t2-W-8	Patient	Ja det er… med en gang jeg har tatt de pillene så må jeg på do de nærmeste 3-4 timene. Men det kommer ikke sånn… det er ikke mye da. Men jeg må på do. Jeg kan ikke planlegge noen aktiviteter akkurat. **Yes it is… straight after I have taken those pills [bumetanide prescribed for use at home] then I have to go to the toilet the next 3-4 hours. But it does not come … it is not a lot though. But I must go to the toilet, I cannot plan any activities as such**	(Patient's first disclosure about this specific adherence problem in the consultation)
t2-W-9	Doctor (HD)	Nei det er jo litt kjedelig da. **No that is a bit of a nuisance**	Doctor aligns emotionally with redflag-topic.
t2-W-10	Patient	Ja det er det, men sånn er det jo da. **Yes, it is. But that's how it is**	
t2-W-11	Doctor (HD)	Hvilken farge har det du tisser, er det lyst eller mørkt? **Which colour is your urine, is it light or dark?**	Doctor seeks additional biomedical information about the effect of the medication.
t2-W-12	Patient	Det er helt vanlig farge. **It is normal colour**	
t2-W-13	Doctor (HD)	Det har ikke vært noen endring i fargen i det siste? **There have not been any changes to the colour recently?**	Doctor seeks additional biomedical information about the effect of the medication.
t2-W-14	Patient	Nei **No**	

t2-W-15	Doctor (HD)	Det er jo fint. Jeg tenker jo at du får litt ekstra her og så tenkte vi å følge litt med på vekten din. Vet du hva du har veid den siste måneden hjemme? **That is good. I think that you are getting some extra here and then I thought we could keep an eye on your weight. Do you know what you weighed the last month at home?**	Doctor pursues another biomedical issue/topic. WRITTEN ADHERENCE SUPPORT: No additional support provided.
Line	**Speaker**	**DISCHARGE VISIT FROM HOSPITAL**	
t2-D-1	Patient	Den *bumetaniden* er noe fanteri også. **That *bumetanide* is "some trickery" as well**	(Patient's first disclosure about this specific adherence problem in the consultation)
t2-D-2	Doctor (HD)	Ja, det er ikke så lett når man må tisse hele tiden. **Yes, it is not so easy when you have to pee all the time**	Doctor aligns emotionally with redflag-topic. Functions as a non-committal response.
t2-D-3	Patient	Nei, hvis vi skal ut på et eller annet så… **No, if we are going out to do something then…**	
t2-D-4	Doctor (HD)	Ja, det er litt sånn invalidiserende. Jeg vet det. **Yes, it is debilitating. I know**	Doctor aligns emotionally and cognitively with redflag-topic. Functions as a non-committal response.
t2-D-5	Patient	[liten pause] Nei men greit. **[slight pause] No, but fine**	
t2-D-6	Doctor (HD)	Er det noe du lurer på? **Is there something else you would like to know?**	Doctor makes a topic change. WRITTEN ADHERENCE SUPPORT: No additional support provided.

S3 NO/ENG Translation Table 5:
Patients signals of unacceptability to doctor's supportive action

REDFLAG-TOPIC	Doctors' supportive action	Doctors' utterance	Patient response	Coding notes
Redflag-topic 5: Patient is worried about having (too) many medications.	Provides information about necessity of medications and indicates potential reduction in number of medications if symptoms changes.	Altså mye av det er jo… altså i hvert fall 3 av medisinene er for å få pulsen din ned, hjertefrekvensen din. Så det er godt mulig de kanskje blir fjernet. Så det kan bli mindre medisiner. **So a lot of it is…at least three of the medications are to bring your pulse down, your heart rate. So it is quite possible that that they might be removed. So there may be less medications.**	Jo det kan være… kanskje jeg kan få ny medisin fra *sykehuset* også nå. **Yes it could be…maybe I can get new medications from the hospital too now.** (repeats being worried about too many medications later in the consultation.)	The patient did not seem convinced by information provided.
Redflag-topic 24: Patient does not understand need for medication and experiences side-effects of medication.	Provides information about benefits and necessity of medications.	Det er jo fordi du har kjent koronar sykdom fra før. Så hos deg så vil vi ha veldig strengt mål på kolesterolet. **It is because you have known coronary disease from before. So with you we would like to have a very strict target on your cholesterol.**	Jeg har skjønt det da. **I have understood that.**	The patient response indicated prior knowledge.
		Jeg så kolesterolet ditt var på 1,2, det der farlige kolesterolet, LDL-kolesterolet. Det er jo fint. Det er egentlig veldig lavt. Men hos deg som har kjent koronar sykdom, og som har hjertesvikt på grunn av det, så er det målet at du skal være under 1,4. **I noticed your cholesterol was at 1.2, that is the dangerous cholesterol, LDL-cholesterol. That is good. That is actually very low. But with you who have a known coronary disease, and who has heart failure because of that, then the target is that you should be below 1.4.**	Jeg er under 1,4. **I am below 1.4.**	The patient did not seem convinced by information provided.

	Indicates possibility to reduce dose in the future.	Det er du. Men det kan jo være litt sånn greit for deg å være klar over at hvis du skulle merke noen bivirkninger av den *atorvastatin* som du bruker, så kan det være mulig å redusere litt på dosen nå som du starter opp med *amiodaron*. Vi har ikke gjort noen endringer nå, men… **That you are. But it can be useful for you to be aware that if you should notice side-effects of that *atorvastatin* that you use, then it can be possible to reduce the dose a bit now that you have started with *amiodarone.* We have not made any changes now, but..**	Ja. Nei men altså når jeg tenker… og litt mindre, fordi den tar enormt med energi altså. **Yes. No, but really when I'm thinking… and a little less, because it drains a lot of energy.** At jeg ikke eier energi. Du må kjempe for alt, for å klare å gjøre noe. Og det synes jeg er slitsomt. **I have no energy. You have to fight for everything, to manage to do something. And I think it is exhausting.**	The patient provides counter-arguments, emphasising current adverse effects.
Redflag-topic 16: Patient expresses negative stance to new dosing schedule and later discloses omitting doses.	Provides information about benefits and necessity of medication.	Det skjønner jeg. Men problemet er at hvis du ikke bruker den [bumetanid] så begynner hjertet ditt å svikte litt mer og mer. **I understand that. But the problem is that if you do not use it [bumetanide] then your heart begins to fail a little more and more.**	Ja, ja, hvis jeg er hjemme og sånn så er det jo greit, ikke sant. Men hvis jeg skal lange veier i bil og sånn da er jeg nødt til å skyve litt på den. **Yes, yes, if I am home then its fine, right. But if I am going long distances in the car and such, then I will have to push it a bit.**	The patient provides counter-arguments and suggests other supportive measures for the doctor's consideration.
Redflag-topic 19: Patient is unable to report medications in use during medication reconciliation, hospital has misplaced medication list given by patient to ambulance personnel.	Provides prompts to trigger memory of medication names and number of daily medications.	Men så står det også at du har brukt en tablett som heter *spironolactone*, - spironolakton. Kan du huske det? **But then it also says that that you have used a tablet called *spironolactone*, - spironolactone. Can you remember it?**	Nei det husker jeg ikke skjønner du. **No I don't remember that, you understand.**	Ineffective prompts; the patient is unable to provide reliable information about medication use.
		Det står også her [legens notater] at du bruker en som heter Lerkanidipine. **It also says here [doctors notes] that you use one called Lerkandidpine.**	Jeg synes jeg kjennes… navnet høres kjent ut. **I think that sounds…the name sounds familiar.**	
		Husker du hvor mange blodtrykksmedisiner du tar totalt? **Do you remember how many blood pressure tablets you take in total?**	Er ikke det tre tror jeg. Eller er det flere? **Isn't it three I think. Or are there more?**	

		Det kommer litt an på, for den som heter *spironolakton* den hjelper også på blodtrykket. Så hvis du regner med den, så har du 4 tabletter på den listen her da. **It depends a bit, because the one called *spironolactone* also helps with blood pressure. So if you count it, then you have 4 tablets on that list here then.**	Totalt så tar jeg vel… er det 6 eller 7 tabletter hver morgen. Men du det husker… må jeg sjekke litt selv også. **In total, I guess…it's 6 or 7 tablets every morning. But you know what I remember…I must check it a little bit myself too.**	
Redflag-topic 47: Patient reports being unable to keep overview and dispense own medications.	Discharge letter.	[Gives discharge letter to patient]	[Leser på utskrivningsnotatet] Jeg skjønner ikke en dritt av dette her. **[Reads discharge letter] I do not understand any of this.** Nei, dette må jo hjemmesykepleien få ta seg av dette **No, the home-nurse services must take care of this.**	The patient provides counter-arguments and suggests other supportive measures for the doctor's consideration.
Redflag-topic 4: Patient reports struggling to keep own medication list updated and worries about taking medication incorrectly as a consequence.	Advises patient to memorise all medications in use and continue organising medications as before.	Ja det blir ofte det. Det er veldig mange som har høyt blodtrykk og diabetes, de havner opp i et sted mellom 10 – 12 medisiner. Og så ganske friske mennesker som er i arbeid. Men det er alltid lurt selv å forsøke å huske det, huske navnene. For plutselig så kommer man oppi en situasjon… Du har jo arbeidet veldig intenst i yrkeslivet så du husker vel med tekniske ting, du har god hukommelse. **Yes, it often does. There are a lot of people who have high blood pressure and diabetes, they end up somewhere between 10-12 medications. Also quite healthy people who are still working. But it is always a good idea to try to remember it yourself, to remember the names. Because suddenly you end up in a situation…You have worked very hard in your professional life, so you probably remember technical things well, you have a good memory.**	Jeg tror jeg husker hele medisinlista. **I think I remember the whole list of medications.**	The patient does not reject the supportive measure outright, but the combination of hedging his response ("I think I remember") after disclosing information (via red-flag topic) that he feels a loss in personal control that relies on his current cognitive abilities indicates that doctor's adherence support is unlikely to improve the situation.

BMJ Open

HOW DO DOCTORS ADDRESS HEART FAILURE PATIENTS' DISCLOSURES OF MEDICATION ADHERENCE PROBLEMS DURING HOSPITAL AND PRIMARY CARE CONSULTATIONS?
An exploratory interaction-based observational cohort study

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HOW DO DOCTORS ADDRESS HEART FAILURE PATIENTS' DISCLOSURES OF MEDICATION ADHERENCE PROBLEMS DURING HOSPITAL AND PRIMARY CARE CONSULTATIONS? An exploratory interaction-based observational cohort study

ABSTRACT

Objectives: To investigate how doctors and self-managing older patients with heart failure (HF) discuss the patients' potential or ongoing medication adherence problems, and how such discussions evolve as patients transition from hospital to home, with particular focus on: (1) doctors' communicative actions aimed at addressing patient disclosures of adherence problems, and (2) patients' feedback indicating whether their doctor's supportive actions were acceptable to them.

Design: Exploratory interaction-based observational cohort study. Inductive microanalysis of authentic patient–doctor consultations, audio-recorded for each patient at: (1) first ward visit in hospital, (2) discharge visit from hospital, and (3) follow-up visit with general practitioner (GP).

Setting: Hospital and primary care, Norway (2022-2023)

Participants: 25 patients with HF (+65 years) and their attending doctors (23 hospital doctors, 25 GPs).

Results: Analysis of 74 consultations, revealed that 25 HF patients disclosed 23 practical adherence problems indicating risks of unintentional non-adherence (e.g., limited resources to manage medications) and 39 perceptual problems indicating risks of intentional non-adherence (e.g., worries, negative experience or stance). Doctors addressed 79% of patients' disclosures by: (1) exploring the scope of the problem, or (2) providing supportive actions to improve patients' ability or motivation to adhere. We calculated nearly five times higher odds for doctors to address patients' practical problems to their perceptual problems (odds-ratio 4.79, 95% CI 1.25-25.83). Unresolved problems included: (1) doctors addressed patients' disclosures, but patients signalled the supportive actions were unsuitable (37%), and (2) doctors left disclosures unaddressed (21%).

Conclusion: In this explorative study, the doctors were more likely to address the patients' adherence problems associated with unintentional non-adherence risks than those associated with intentional non-adherence risks. Even when doctors attempted to address HF patients' medication adherence problems, half of the problems remained unresolved, usually because patients indicated that the doctor's suggestion to improve their situation was against their preference.

ARTICLE SUMMARY

Strengths and limitations of this study

- A detailed and comprehensive description of how often and how doctors respond to HF patients' disclosures indicating risks of medication non-adherence and, in turn, how patients respond to doctors' supportive actions.
- Analysis of authentic medical consultations at three key time points for each patient as they transition from hospital to home.
- Participant reactivity to the study situation may have led to more talk about medications and "best practice behaviour".
- Limited generalisability to other settings and patient groups.

INTRODUCTION

Heart failure (HF) is a chronic, life-threatening condition prevalent among older people [1 2]. The global burden is high (estimated to affect 64 million people in 2023) and growing, due to an aging population[1]. The cornerstone of HF management to alleviate symptoms, reduce hospital admissions, and improve life expectancy is pharmacotherapy, using a combination of four to five medications [3-5]. Older patients with HF often have co-morbidities, leading to complex regimens with more than ten medications [6 7]. In this patient group, medication adherence is alarmingly low [8 9], thereby limiting therapeutic benefits[10]. Patients with HF fail to take their medications as prescribed for several reasons, including not understanding the prognosis and the purpose of their prescriptions, complex medication schedules, and experience of adverse effects [11-15]. Medication non-adherence can be intentional or unintentional[16 17], which emphasises the need for doctors to assess patients' ability and motivation to take their medications as prescribed[18]. Therefore, guidelines recommend that clinicians talk to patients about their medication use to ensure that any treatment decisions are based on current intake of medications[19 20].

Although good communication between patients and doctors improves medication adherence [21 22], little is known about how patients with HF and their doctors talk about adherence in medical consultations. Indeed, most studies analysing interactions have focused on other patient groups in outpatient settings[23-29]. More knowledge is needed about how doctors and patients with HF talk about adherence problems, and how doctors address such problems. Building such knowledge begins with defining these phenomena, identifying and analysing them as they occur in authentic consultations, and deriving implications for enhancing future practice. Due to frequent hospital readmissions in this patient group, longitudinal studies can inform how conversations about adherence problems evolve over time and experience and as patients are cared for by different doctors in hospital and primary care. Ideally, acquired knowledge can inform content and examples for communication skills training aimed at improving patient adherence.

In a previous study, we analysed 74 real-life consultations between 25 self-managing older patients with HF and 48 doctors and found that the patients often disclosed information to their doctors that signalled potential or ongoing medication adherence problems at home[30]. The present study built on these identified problem disclosures and aimed to investigate the discussions that emerged from them. Data were the same authentic audio-recorded consultations and medical records collected at three time-points as patients transitioned from hospital to home. We recognised, defined, and

counted our phenomena of interest: (1) doctors' communicative actions aimed at addressing patient disclosures of adherence problems, and (2) patients' feedback to the doctors indicating whether their supportive actions were acceptable to them.

METHODS

Overview of study design, participants, and data collection

This is an exploratory interaction-based observational cohort study. We followed 25 older patients with heart failure from their admission to the hospital to their return home and their first follow-up visit with their GP.

Recruitment of study participants (patients, hospital doctors, GPs) and data collection took place from February 2022 to February 2023. We recruited patients to this study who were admitted from home to the heart ward at Akershus University Hospital in Norway and fulfilled our inclusion criteria; they were diagnosed with HF, 65 years or older, managing their own medications, and living in the catchment area of the hospital. We excluded patients who required an interpreter or had a temporarily reduced ability to consent according to the ward nurse. Doctors in this study were either hospital doctors or GPs who attended to patients during the consultations selected for observation. See Table 1 for participant characteristics.

We identified and invited eligible patients to participate following these three steps: (1) the project assistant (TSB) screened admission records from the heart ward every morning, Monday to Friday, (2) two researchers (CF, HB) verified inclusion criteria and exclusion criteria with the ward nurse, and (3) recruited the attending hospital doctor. We informed all doctors about the study prior to recruiting patients. We observed and audio-recorded the following three patient-doctor consultations: (1) first heart ward visit in hospital, (2) discharge visit from hospital, and (3) first follow-up visit with GP. Table 1 provides details about the audio-recorded consultations. Audio-recordings were transcribed verbatim, and observation notes were added when relevant for interpretation of the speech (e.g., who was present, what happened during periods of silence, objects patients or doctors pointed to or showed each other). In addition, we collected information from medical records to extract HF history, discharge letters, and current prescriptions.

We have used the STROBE cohort checklist[31] to report how the study was planned and conducted.

Table 1: Characteristics of participants and audio-recorded consultations

PATIENTS: Persons (+65 years) diagnosed with heart failure	**n=25**
Female, n (%)	8 (32%)
Age, median (min-max)	76 (67-90)
NYHA classification III, IV [1], n (%)	15 (60%), 7 (28%)
Ejection fraction [2], EF% below 35%	11 (44%)
Cognitive function [3], median score (min-max)	23 (16-30)
Diagnosed with HF more than 3 months ago [2], n (%)	15 (60%)
Diagnoses according to discharge letter, median (min-max)	3 (1-6)
Number of medications at hospital admission [2,4], median (min-max)	6 (0-14)
Number of medications at hospital discharge [2,4], median (min-max)	8 (4-16)
Patients with the following heart medications prescribed in their regimen [2,4], n (%)	Hospital admission / Hospital discharge

Angiotensin-Converting Enzyme (ACE)- inhibitor or Angiotensin Receptor-Neprilysin Inhibitor (ARNI)	19 (76%) / 24 (96%)
Antiarrhythmic medication	9 (36%) / 14 (56%)
Anticoagulant or antiplatelet	20 (80%) / 24 (96%)
Betablocker	15 (60%) / 22 (88%)
Diuretic for regular or intermittent use	13 (52%) / 16 (64%)
Mineralocorticoid Receptor Antagonist (MRA)	5 (20%)/ 15 (60%)
Sodium-glucose co-transporter-2 (SGLT-2) inhibitor	7 (28%)/ 19 (76%)
HMG-CoA reductase inhibitor (Statin)	20 (80%) / 17 (68%)
HOSPITAL DOCTORS	**n=23**
Female, n (%)	17 (74%)
Age, median (min-max)	31 (24-50)
Professional role as junior doctor, n (%)	22 (96%)
Years of work experience, median (min-max)	2.8 (0-17)
GENERAL PRACTITIONERS	**n=25**
Female, n (%)	8 (32%)
Age, median (min-max)	50 (35-71)
Professional role as junior doctor, n (%)	5 (20%)
Years of work experience, median (min.-max.)	16 (1-44)
AUDIO-RECORDED CONSULTATIONS	**n=74**
First heart ward visit in hospital (n=24), duration mean, (min - max)	14.7 minutes (6-23)
Discharge visit from hospital (n=25), duration mean, (min - max)	12.2 minutes (5-25)
First follow-up visit with GP (n=25), duration mean, (min - max)	22.8 minutes (10-44)
Days from hospital admission to hospital discharge visit, median (min-max)	6 (1-20)
Days between hospital discharge and follow-up visit with GP, median (min-max)	10 (2-43)

[1] New York Heart Association Functional Class[3], according to patients' medical records, [2] According to patients' medical records, [3]Cognitive function measured with MoCA assessment version 8.1 [32], median score (range), [4] Prescribed for regular use.

Data analysis

This study used Microanalysis of Clinical Interaction (MCI) [33], which begins openly, directed by the overall purpose of the project (in this case, how doctors respond to patient utterances regarding what they are doing at home with their prescription medication). Focused inductive work involved listening to recorded consultations and noting observations on transcripts. Working iteratively with a subsample of the material, researchers use MCI to derive essential criteria for how to recognize the phenomenon and develop detailed operational definitions (e.g., what constitutes a response). Researchers document the analysis in a coding manual, rendering it transparent and reproducible; they then apply the coding to all recordings to build a systematic and comprehensive collection of the phenomenon of interest. According to MCI, once the collection is complete, researchers characterise the phenomena inductively (e.g., how various types of responses differ). The procedures used in MCI can shed light on relationships between the phenomenon of interest and relevant variables such as patient characteristics, the setting, or features in the interaction.

In the previous study, we had defined and identified patients' Medication Adherence Disclosures in Clinical Interactions (MADICI)[30], that is, patient utterances to their doctor during medical consultations disclosing their medication adherence, recognised by two essential elements: (1) the

utterance is about medications prescribed for use at home, and (2) it includes information about patients' actions, experience, or stance regarding medications.. Of the 427 MADICI we identified in the 74 audio-recorded consultations, we had found that 235 (55%) included information signalling either a potential risk for non-adherence or outright non-adherence[30].

In the current study, we used MCI inductively to explore whether and how doctors addressed these 235 problem disclosures, and how patients responded when doctors' addressing actions were suggestions for adherence support. How we recognised and characterised MADICI is documented with illustrative examples in our MADICI Codebook, which is available in the online supplementary materials (file S1).

We made three initial assumptions in the current study: (1) patients may disclose problems about different topics (e.g., experiencing adverse effects AND forgetting to take medications) that they may reiterate in the same consultation or in other consultations, (2) different types of problems may trigger different addressing actions from doctors and should be analysed separately (e.g., actions doctors take to address how the patient is experiencing adverse side effects would be different than those to address the patient forgetting to take medications), and (3) doctors' addressing actions during consultations may be communicated to patients verbally or may be evident in their documented actions.

The analysis consisted of three steps (See Figure 1). Step 1 was to delineate our unit of analysis, which was any discussion about a patient's specific adherence problem during one consultation, including anything relevant in the doctor's written documents about that patient's treatment plan. Accordingly, for each patient, we collected the previously-identified problem disclosures about the same adherence problem into topics (coined as redflag-topic). To exploit the study's longitudinal design, the patient's first disclosure about the specific problem in any consultation was the entry point for examining all consultations for discussions on that topic. We categorised redflag-topics informed by the "Perceptions and Practicalities Approach" (PAPA) framework[18]. The PAPA framework focuses on how patients interact with their agreed-upon treatment and proposes that patients' adherence to medications is enhanced or reduced by their ability or motivation (or both) to use their medications as prescribed. Whereas motivation influences patients' conscious (i.e., intentional) decision to use or not use their medications, patients with limited practical resources and capabilities are prone to unintentional non-adherence. For each redflag-topic, we considered whether the patient signalled a perceptual/motivational adherence problem that could ultimately lead to intentional non-adherence, or a practical/capability barrier that could ultimately lead to unintentional non-adherence.

In step 2, we developed operational definitions of doctors' communicative actions aimed at addressing the redflag-topic, and we noted when these actions included adherence support. Then we used a mixed effects logistic regression to investigate the potential differences between doctors addressing actions of redflag-topics that we categorised as either "perceptual" or "practical" in step 1. In the regression we used doctors' addressing action as the outcome variable, perceptual / practical as fixed effect, and consultation setting (first ward visit, discharge visit, GP-visit) as random effect. Analyses were performed using R (V. 4.4.2) in Rstudio (V. 2023.06.0).

In step 3, we developed operational definitions to identify what feedback doctors received from patients' responses to their adherence support, that is, whether patients indicated the adherence support was acceptable. The purpose of this step was to ascertain whether doctors' supportive actions were tailored to patients' preferences, which foreshadowed the likelihood of those actions to improve patients' adherence situation in the foreseeable future. In consultations where patients

changed their preferences during the interaction, we made our analytical decision based on patients' final response. The coding manual with illustrative examples is available from the first author upon request.

We worked iteratively within each step and completed each step before starting the next. When developing operational definitions, we purposefully selected data from three newly diagnosed patients and three patients with known HF. As the definitions coalesced, we gradually expanded our analysis to the full dataset. Developing the definitions started with one researcher (CF) building a collection of examples demonstrating the phenomena of interest in specific, observable actions by listening to audio-recordings and investigating written materials. CF used transcripts in Microsoft Excel for reference and for recording all analytical decisions. CF analysed and coded all interactions, meeting with JG regularly to discuss the collection, resolve difficult cases by consensus, and refine definitions. Twice we presented examples and preliminary definitions for peer review to a multidisciplinary team of health communication researchers attending our MCI workshop. In addition, CF held individual meetings with one patient representative and several senior medical doctors (cardiology, acute care, general practice) to discuss relevance of our analytical approach for clinical practice.

Ethical and privacy considerations

This study is funded by the Norwegian Research Council 31.08.2021 as part of the MAPINFOTRANS research project (ref. 291946). Following review of the project description, the Regional Committee for Medical and Health Research Ethics concluded that MAPINFOTRANS was exempt from review (ref. 273688).

During the recruitment process, we verified that patients were competent to consent. All study participants signed an informed consent before taking part. Data used in this study has been collected, handled, and stored according to the procedures approved by the Data Protection Officer at Akershus University Hospital (ref 2021_146).

RESULTS

For each step of analysis, we present our definitions and examples developed during analysis as well as the quantitative results.

Topics of patients' disclosures of adherence problems

We identified 62 specific adherence problems (redflag-topics) in the 235 patient disclosures, which could refer to risks of unintentional non-adherence (n=23, 37%) or intentional non-adherence (n=39, 63%). Unintentional adherence risks related to patients' internal or external practical problems, and particularly to: (1) Healthcare systems related barriers, (2) Limited ability to organise intake of medications in use, and (3) Limited ability to recall or recognise medications in use. Intentional adherence risks related to patients' perceptions and included: (1) Negative stances, (2) Negative experiences, and (3) Concerns or worries. Of the 62 problem disclosures, 34 (52%) were only mentioned during GP-visits, 14 (23%) were mentioned in two of three consultations, and three problems (5%) were mentioned in all three consultations. Table 2 presents definitions, illustrative examples, and frequencies of topics of patients' problem disclosures, categorised into types of adherence barriers and unintentional/intentional adherence risk. Details about all 62 redflag-topics are provided in the online supplementary materials (file S2).

Table 2 Topics of patients' disclosures of adherence problems, grouped by patient-oriented adherence barrier

Topic of adherence problem disclosure (number of patients disclosing this topic)	**Recognised when patients' problem disclosure includes information about:**	**Type of patient-oriented adherence barrier and non-adherence risk according to PAPA Framework[18]**	**Illustrative examples of patients' problem disclosures** *
Health care systems related barrier (n=4)	… external practical problems stemming from the healthcare system, e.g., prescribing errors, unavailability of medications on the market.	Practical factor (e.g., ability and resources), associated with risk of unintentional non-adherence.	• Patient is worried she has used the wrong dose due to different information in the discharge letter and pharmacy label. • Patient reports being unable to fill prescription.
Limited ability to organise intake of medications in use (n=8)	… forgetting to take medications or having limited ability or resources to organise their medications on a regular basis.	Practical factor (e.g., ability and resources), associated with risk of unintentional non-adherence.	• Patient reports being unable to dispense own medications. • Patient forgets to take medications.
Limited ability to recall or recognise medications in use (n=11)	… inability to recall or recognise which medications they are using, as evident in inability to report that information during consultations.	Practical factor (e.g., ability and resources), associated with risk of unintentional non-adherence.	• Patient is unable to report medication intake in accordance with prescribed regimen. • Patient reports he does not recognise the medication the doctor is talking about.
Negative stance to medications (n=10)	… reduced motivation to take medications as prescribed (e.g., wants to change, discontinuing).	Perceptual factor (e.g., beliefs and motivation), associated with risk of intentional non-adherence	• Patient reports symptoms he thinks are adverse effects and wants to reduce medications he believes are unnecessary. • Patient has discontinued medication.
Negative experience with medications (n=21)	… negative experiences after using medications (e.g., adverse drug reactions), but without mentioning a reduced motivation to adhere.	Perceptual factor (e.g., beliefs and motivation), associated with risk of intentional non-adherence	• Patient reports adverse effects. • Patient reports lack of effect of medication.
Concerns or worries about medications (n=8)	… concerns or worries about benefits or preferences about their medications in use.	Perceptual factor (e.g., beliefs and motivation), associated with risk of intentional non-adherence	• Patient is worried about having (too) many medications. • Patient is unsure why she needs medication.

*Full overview of the 62 redflag-topic descriptions is provided in the online supplementary materials, file S2

Patients disclosed up to four different adherence problems to their doctors along their patient trajectory; seven patients disclosed one problem, five patients two problems, eight patients three problems and five patients four problems. Analysing three key consultations along 25 patient trajectories, we identified that the 62 specific adherence problems appeared in consultations 82 times (recall that the unit of analysis was any discussion about a patient's specific adherence problem during one consultation).

Doctors' actions in response to patients' problem disclosures

We analysed doctors' verbal and written communicative actions to address patients' problem disclosures, just after the disclosure or later in the consultation, that could foreseeably change the patient's situation. These actions were broadly categorised into "addressing" or "not addressing" the patients' problem disclosure (redflag-topic).

Doctors' addressing actions

We defined ***addressing*** as any communicative action that indicates that the doctor is orienting to the patient disclosure by: (1) Exploring the scope of the problem (e.g., seeking more information about the patient's perception or adherence behaviour), AND/OR (2) Providing supportive actions to improve the patient's ability or motivation to adhere (e.g., providing information, prompting, suggesting alternatives to manage the situation, co-reasoning about options, deciding to change prescriptions, ordering professional services).

We observed that the timing of doctors' responses to patients' problem disclosures varied greatly. Sometimes doctors would respond immediately, while other times they waited until the patient repeated it. Sometimes doctors delayed their full responses, reintroducing the topic later to discuss how to handle it. We observed some cases where the doctor simply changed the patient's prescription in response to the patient's disclosure without discussing it.

As an illustrative example, Table 3 presents an excerpt from an interaction where the patient discloses an adherence problem to the GP, who addressed it. In this example, the patient reports forgetting to take medications (line t50-F-4), thereby signalling to the doctor an ongoing adherence problem. After an immediate response to clarify that "them" refers to "medications", the doctor proceeds to address the disclosure by (1) seeking more information about the scope of the problem (line t50-F-7) AND (2) providing several types of supportive actions. These include ordering professional services, using alarms and daily routines to reduce the risk of forgetting (lines t50-F-9, t50-F-15), co-reasoning about these alternatives (lines t50-F-19, t50-F-21) and suggesting in the end of the consultation to "wait and see" (line t50-F-23). The doctor provided no additional adherence support to the patient in writing. These addressing actions revealed the scope of patient's non-adherence behaviour and provided the patient (and companion) with information that there are many options available to them to improve the situation. Original transcript in Norwegian with translation to English is provided in online supplementary materials (file S3).

Table 3 Illustrative example of an addressed disclosure

Redflag-topic 50: Patient forgets to take medications. Indicated adherence barrier: Limited ability to organise intake of medications in use (Practical problem, risk of unintentional non-adherence)			**Coding notes**
Line	**Speaker**	**FIRST FOLLOW-UP WITH GP**	

t50-F-1	Doctor (GP)	Do you feel it goes well to manage your own medications?	
t50-F-2	Patient	Yes…yes I believe so. I could have brought with me the dosette box here now to show you how I have put them in, but it is 5…6 medications that I use. Well, one thing that I am very bad at is to remember the names of those medications. So that tells me nothing.	
t50-F-3	Doctor (GP)	No, and it is not so easy because unfortunately it is so that it can be written one name on the medication and then you get something…then it is the generic name that they hand out from the pharmacy and then it gets…	
t50-F-4	Patient	Yes, yes, so…but then I read on the label, and then I lay out if it is morning and evening, so I put them out directly and then I take the next box. But then I have to admit that it happens that I forget to take them.	(Patient's first disclosure about this specific adherence problem in the consultation)
t50-F-5	Doctor (GP)	Medications?	
t50-F-6	Patient	Yes. And it can be both morning and evening.	
t50-F-7	Doctor (GP)	**But how often does that happen?**	Doctor seeks additional information about patient's adherence behaviour and scope of the problem
t50-F-8	Patient	It is probably once a week I have one or another like … that I go "damn, now I forgot it yesterday"	
t50-F-9	Doctor (GP)	**Because that is what potentially could be the reason why we should get home care nurses to perhaps follow that up a bit more,** if you forget it too often. Of course, once in a while is no crisis, but if it is a regular occurrence that it happens…. **But could you have an alarm on your watch that made a "pip-sound"?**	Doctor provides adherence support: Suggests (1) ordering professional services to take responsibility for management of medications, and (2) using alarms to alert medication intake
t50-F-10	Patient	I have been given that.	
t50-F-11	Doctor (GP)	**But one that gives a sound at regular times when you should take your medication.**	Doctor continues to suggest using alarms
t50-F-12	Patient	Yes… [patient sounds pensive]	(Interpreted as a listening response not as acceptance)
t50-F-13	Doctor (GP)	**It is possible to enter regular alarms if that could be easier.**	Doctor continues to suggest using alarms
t50-F-14	Patient	Yes.. yes…[patient sounds pensive]	(Interpreted as a listening response not as acceptance)
t50-F-15	Doctor (GP)	**Or that you have a routine that you take them when you brush your teeth for example, right?**	Doctor provides adherence support (3) suggests using daily routines to support adherence.
t50-F-16	Patient	Yes, that is morning and evening	
t50-F-17	Doctor (GP)	Mm. It is about remembering it.	
t50-F-18	Companion to patient	It is lying in the middle of his kitchen table so… I suppose we could keep an eye on it too and then we can discuss what we think. Because we are there a lot and…	Companion suggests other options in response to patient's hesitation to doctor's suggestions
t50-F-19	Doctor (GP)	**Yes. No, because I understand that for *patient name* too, you think that…it is probably good to manage and keep track of it yourself as such**	Co-reasoning about adherence support.
t50-F-20	Patient	Yes yes yes	
t50-F-21	Doctor (GP)	**And if that works then that is fine. But if it becomes that too often you forget to take it then it is …**	Co-reasoning about adherence support.
t50-F-22	Patient	Pft…I forget it once a week I suppose	
t50-F-23	Doctor (GP)	**But why don't you keep an eye on it, and then we can stay in touch.** [closing remarks]	Doctor suggests they should wait and see. WRITTEN ADHERENCE SUPPORT:

			No additional support provided.
NOTE: We use ***italics*** to signal where we have replaced names and medication brands for anonymity and universal comprehension. Information required for comprehension is provided in [square brackets].			

We defined that patients' problem disclosures remained ***unaddressed*** when doctors' actions were limited to utterances orienting away from the adherence problem by: (1) neutral, non-committal responses (e.g., listening responses, reformulating to clarify), (2) pursuing biomedical issues (e.g., symptoms, diagnostic tests), (3) changing the topic, and (4) emotional and cognitive alignment. In the illustrative example below, from the first ward visit in hospital, the patient discloses how the effect of bumetanide limits his daily activities. This disclosure signals that the patient may have a low motivation to use this medication as prescribed. Here, the doctor immediately provides emotional support ("no that is a bit of a nuisance") before pursuing a biomedical issue about the medication ("Which colour is your urine, is it light or dark"):

> Doctor: But what is it like at home?
> Patient: Yes it is… straight after I have taken those pills [bumetanide prescribed for use at home] then I have to go to the toilet the next 3-4 hours. But it does not come … it is not a lot though. But I must go to the toilet, I cannot plan any activities as such.
> Doctor: No that is a bit of a nuisance.
> Patient: Yes, it is. But that's how it is.
> Doctor: Which colour is your urine, is it light or dark?

The patient brought up the same problem during the discharge visit when another doctor presented him with an updated medication list, still including bumetanide. Again, the doctor did not address it. Full transcript with coding notes for both consultations are available in online supplementary materials (file S4).

Frequencies of doctors' addressing actions

Table 4 presents whether and how doctors addressed patients' problem disclosures in 82 consultations, organised by topic and consultation setting.

We identified 31 consultations during which patients disclosed problems associated with an unintentional non-adherence risk (i.e., patients' practical problems). In 28 of these 31 consultations (90%), doctors addressed the patient's problem disclosure either by exploring it further (21 of 28 consultations), providing supportive actions (27 of 28 consultations), or a combination of both. The proportion of doctors who addressed patients' disclosures of practical problems was high in all settings.

We identified 51 consultations during which patients disclosed problems associated with an intentional non-adherence risk (i.e., patients' negative perceptions). In 37 of these consultations (73%), doctors addressed the patient's problem disclosure either by exploring it further (23 of 37 consultations), providing supportive actions (36 of 37 consultations), or a combination of both. We observed differences between settings: Doctors addressed patients' negative perceptions disclosed during the first ward visits 3 of 8 times, 7 of 11 times during discharge visits, and 27 of 32 times during GP-visits.

We observed differences in how often doctors addressed patients' problem disclosures indicating different topics and investigated these further. Using a mixed effects logistic regression to estimate potential differences of doctors addressing patients' disclosures signalling practical or perceptive

adherence barriers, we calculated the odds ratio to be 4.79, with a 95% confidence interval of (1.25 to 25.83). This result indicates that it is nearly 5 times higher odds for doctors to address patients' practical adherence problems (e.g., reduced ability to organise intake) to their perceptual problems (e.g., negative experiences).

Table 4 Frequency of doctors' addressing actions and patients' feedback

Topic of patients' adherence problem disclosure	PATIENTS' ACTIONS	DOCTORS' COMMUNICATIVE ACTIONS IN RESPONSE TO PATIENTS' DISLOSURES			PATIENTS' ACTIONS
	Visits with problem disclosed	Addressed	Addressed by exploring further [a]	Addressed by providing supportive actions [b]	Signalled unacceptability to adherence support [c]
FIRST WARD VISIT (n=18):					
Health care systems related barrier	0	n/a	n/a	n/a	n/a
Limited ability to organise intake of medications in use	3	2	2	1	1
Limited ability to recall or recognise medications in use	7	6	6	6	3
Negative stance to medications	2	1	1	1	1
Negative experience with medications	6	2	1	2	2
Concerns or worries about medications	0	n/a	n/a	n/a	n/a
DISCHARGE VISIT (n= 16):					
Health care systems related barrier	0	n/a	n/a	n/a	n/a
Limited ability to organise intake of medications in use	3	3	2	3	1
Limited ability to recall or recognise medications in use	2	2	0	2	0
Negative stance to medications	5	2	1	2	2
Negative experience with medications	5	4	2	4	2
Concerns or worries about medications	1	1	1	1	0
FOLLOW-UP VISIT WITH GP (n= 48):					
Health care systems related barrier	4	4	4	4	0
Limited ability to organise intake of medications in use	6	5	4	5	3
Limited ability to recall or recognise medications in use	6	6	3	6	2
Negative stance to medications	7	6	5	5	2
Negative experience with medications	18	16	11	16	4
Concerns or worries about medications	7	5	1	5	1
Overall	**82**	**65 of 82**	**44 of 65**	**63 of 65**	**24 of 65**

		(79%)	(68%)	(97%)	(37%)
SUB-ANALYSIS for the 12 patients who disclosed the same problem in more than one consultation					
Limited ability to organise intake of medications in use	7	7	6	6	3
Limited ability to recall or recognise medications in use	7	7	5	7	2
Negative stance to medications	7	6	5	6	5
Negative experience with medications	16	10	7	10	4

[a] Doctor exploring the scope of the problem further, [b] Doctor providing verbal or written supportive actions to improve patient's ability or motivation to adhere, [c] Patient utterance including information signalling doctors' adherence supportive action was against their own preferences or indicating it was unlikely to change their situation in the foreseeable future.

Patients' responses to doctors' supportive actions

We observed that patients' reactions to doctors' supportive actions varied greatly. While there were some clear indications of acceptance and some outright rejections, sometimes patients would indicate that they preferred another solution, for example by co-reasoning with the doctor about alternatives or bringing forward ideas of their own. Sometimes there was just silence, which could either indicate the patient responded only with visible action or did not respond at all.

Based on our observations, we decided to identify patient utterances signalling clear unacceptability to doctors' adherence support. Our rationale was two-fold: (1) working with audio-recordings we were missing co-speech gestures and facial expressions thereby making it difficult to interpret patients' minimal verbal responses (e.g., "mm", "yes", "no"), and (2) communication-based research has shown that there is a "normative obligation" for patients to express agreement[27] rather than disagreement to doctors suggestions, thereby making non-acceptability a more precise indicator for how well doctors' actions met patients' preferences.

Patient acceptability

We defined ***unacceptability*** as patient utterances that included information that the doctor's supportive action was against their own preferences or indicated that it was unlikely to change their situation in the foreseeable future. We recognised patient unacceptability when (1) the patient response indicated prior knowledge (e.g., information given did not fill a knowledge gap), (2) the patient did not seem convinced by the provided information (e.g., gave counter arguments, alternative hypotheses), (3) the patient suggested other supportive measures for the doctor's consideration (e.g., dose reduction, deprescribing), (4) the patient preferred to maintain status quo (e.g., wait and see), (5) the patient did not reject the supportive action outright, but shared information that indicated a negative stance or negative experience (e.g., told a history of a past experience that did not work), or (6) when the doctor's prompts were ineffective to reveal reliable information from the patient about their medication use.

Table 5 provides illustrative examples of how we recognised patient's signals of unacceptability to doctor's supportive action. The table presents problems that were addressed by doctors, with examples of doctors' supportive actions (not exhaustive) that the disclosures elicited. Original quotes in Norwegian with translation to English is provided in online supplementary materials (file S5).

Table 5 Patients signals of unacceptability to doctor's supportive action

TOPIC OF ADHERENCE PROBLEM	Doctors' supportive action	Doctors' utterance	Patient response	Coding notes
Redflag-topic 19: Patient is unable to report medications in use during medication reconciliation, hospital has misplaced medication list given by patient to ambulance personnel.	Provides prompts to trigger memory of medication names and number of daily medications.	"But then it also says that that you have used a tablet called *spironolactone*, - spironolactone. Can you remember it?"	"No I don't remember that, you understand."	Ineffective prompts: the patient is unable to provide reliable information about medication use.
		"It also says here [doctor's notes] that you use one called Lercanidipine."	"I think that sounds…the name sounds familiar."	
		"Do you remember how many blood pressure tablets you take in total?"	"Isn't it three I think. Or are there more?"	
		"It depends a bit, because the one called *spironolactone* also helps with blood pressure. So if you count it, then you have 4 tablets on that list here then."	"In total, I guess…it's 6 or 7 tablets every morning. But you know what I remember…I must check it a little bit myself too."	
Redflag-topic 47: Patient reports being unable to keep overview and dispense own medications.	Discharge letter.	[Gives discharge letter to patient]	[Reads discharge letter] "I do not understand any of this." "No, the home-nurse services must take care of this."	The patient provides counter-arguments and suggests other supportive measures for the doctor's consideration.
Redflag-topic 4: Patient reports struggling to keep own medication list updated and worries about taking medication incorrectly as a consequence.	Advises patient to memorise all medications in use and continue organising medications as before.	"Yes, it often does. There are a lot of people who have high blood pressure and diabetes, they end up somewhere between 10-12 medications. Also quite healthy people who are still working. But it is always a good idea to try to remember it yourself, to remember the names. Because suddenly you end up in a situation…You have worked very hard in your professional life, so you probably remember technical things well, you have a good memory."	"I think I remember the whole list of medications."	The patient does not reject the supportive measure outright, but the combination of hedging his response ("I think I remember") after disclosing information (via red-flag topic) that he feels a loss in personal control that relies on his cognitive abilities indicates that doctor's advice is unlikely to improve the situation.

Redflag-topic 5: Patient is worried about having (too) many medications.	Provides information about necessity of medications and indicates potential reduction in number of medications if symptoms change.	"So a lot of it is…at least three of the medications are to bring your pulse down, your heart rate. So it is quite possible that that they might be removed. So there may be less medications."	"Yes it could be…maybe I can get new medications from the hospital too now." (patient repeats being worried about too many medications later in the consultation.)	The patient displays scepticism ("could be…", "maybe"), indicating a lack of being persuaded by the information provided.
Redflag-topic 24: Patient does not understand need for medication and experiences side-effects of medication.	Provides information about benefits and necessity of medications.	"It is because you have known coronary disease from before. So with you we would like to have a very strict target on your cholesterol."	"I have understood that."	The patient response indicated prior knowledge.
		"I noticed your cholesterol was at 1.2, that is the dangerous cholesterol, LDL-cholesterol. That is good. That is actually very low. But with you who have a known coronary disease, and who has heart failure because of that, then the target is that you should be below 1.4."	"I am below 1.4."	The patient argues that the level is where the doctor says it should be, displaying a lack of being convinced by information provided.
	Indicates possibility to reduce dose in the future.	"That you are. But it can be useful for you to be aware that if you should notice side-effects of that *atorvastatin* that you use, then it can be possible to reduce the dose a bit now that you have started with *amiodarone*. We have not made any changes now, but.."	"Yes. No, but really when I'm thinking… and a little less, because it drains a lot of energy." "I have no energy. You have to fight for everything, to manage to do something. And I think it is exhausting."	The patient provides counter-arguments, emphasising current adverse effects.
Redflag-topic 16: Patient expresses negative stance to new dosing schedule and later discloses omitting doses.	Provides information about benefits and necessity of medication.	"I understand that. But the problem is that if you do not use it [bumetanide] then your heart begins to fail a little more and more."	"Yes, yes, if I am home then its fine, right. But if I am going long distances in the car and such, then I will have to push it a bit."	The patient provides counter-arguments and suggests other supportive measures for the doctor's consideration.

Frequency of patients' signals of unacceptability

Table 4 presents patients' feedback in response to their doctors' suggested adherence support. Near 40% of patients responded with negative feedback to their doctors' suggestions of adherence

support. Most problems were discussed during the GP-visit, and our results indicate that GPs' supportive measures were more acceptable to patients than those suggested by hospital doctors.

Patients disclosed topics about healthcare related adherence barriers only to their GPs, whose supportive actions were always acceptable to patients.

Adherence problems repeated along patient trajectories

So far, all results have been based on single consultations, without taking the longitudinal design into account. Now we will present results for the patients who disclosed the same adherence problem in more than one consultation as they transitioned from hospital to home.

Near 50% of HF patients disclosed the same (potential) problem to their attending doctor in different settings. Most of these (n=10) had known HF. They contributed 17 topics in total, about these non-adherence risks: negative experience with medications (n=8), negative stance to medications (n=3), limited ability to recall or recognise medications in use (n=3), and limited ability to organise intake of medications (n=3). Two patients disclosed the same problem in all three consultations. Table 4 also presents a sub-analysis of the topics these 12 patients discussed in consultations.

Ten of the 12 patients disclosed a perceptual problem, thereby indicating an intentional non-adherence risk. For two of these patients, none of their doctors addressed the problem. Of the remaining eight, four patients experienced that all doctors addressed their disclosures, and they accepted the doctors' supportive actions discussed in the GP-visit.

Six of the 12 patients disclosed a practical problem, thereby indicating risks of unintentional non-adherence. Doctors always addressed these patients' problem disclosures. Patients who received help to recall which medications they were using, always accepted their doctors' supportive actions (usually prompts about names and doses). In contrast, patients who struggled with keeping overview and organising their medications, never accepted suggestions provided at the GP-visit after returning home from the hospital.

DISCUSSION

This is the first explorative study to investigate how doctors and self-managing, older patients with HF discuss patients' disclosures of medication adherence problems with each other, and how such discussions evolve over time and experience and as patients talk to different doctors. This study offers an "inside view" of how doctors use their communication skills to address patients' potential or ongoing medication adherence problems, and how in turn, patients respond to their supportive actions. Given the persistently low medication adherence rates in this patient population, a better understanding of this information exchange in practice is valuable to inform practitioners, educators, and researchers who work to improve adherence to HF treatment.

The findings showed that near 50% of HF patients disclosed the same (potential) problem to their attending doctor in different settings, suggesting that it was an ongoing or recurring issue. Nearly all of them reported problems associated with intentional non-adherence (perceptual issues), while 50% of them reported problems associated with unintentional non-adherence (practical issues). These findings are somewhat surprising given the fact that unintentional non-adherence is considered more common [17 34]. One explanation is that due to our recruitment process, patients

were more self-efficacious than average HF patients, thereby having the ability to manage their medications well. Another possible explanation for this finding might be patients underreporting problems since they may prefer to withhold information about their intentional "medical misdeeds"[25 35]. We observed that doctors' questions were mainly focused on reconciliation of which medications the patient had been prescribed by other doctors, often failing to follow up with questions about how patients were managing to use them at home (see Table 3 for a good example of eliciting the latter). This observation may be due to time-constraints or unawareness of the distinction between the two, but it can also be due to insufficient training in how to elicit information about patients' adherence behaviour. Health communication research recommends doctors to "ask-tell-ask" [15], using open, non-judgemental questions about patients ability to manage their medication intake [36-38], adding explicit questions for precise information about omitted doses [39]. This approach also gives doctors the possibility to discover and resolve patients' misconceptions[40].

A second key finding was that most adherence talks took place at the GP-visit. Possible explanations for this observation include: (1) junior hospital doctors may prefer to defer challenging discussions (e.g., emotional and time-consuming talks) to the patients' GP who has an established relationship with the patient [11 41 42], (2) patients may prefer to discuss problems with their long-standing doctors [12 30 43 44], and (3) before patients can assess their ability and motivation to adhere to their medications and formulate "complaints", they need time to experience what it is like to use them.

A third key finding was that these doctors addressed most of the patients' disclosures of medication adherence problems, sometimes by exploring the problem further but most often by providing supportive actions. This finding indicates that doctors were sensitive to and acted on such disclosures, which aligns with previous studies reporting that doctors feel responsible for addressing underlying factors for non-adherence [23 39]. However, we found that when doctors addressed patients' disclosures, they were five times more likely to handle problems associated with unintentional non-adherence (e.g., signals of forgetting doses, inability to manage complex regimens, prescription errors) than perceptual problems associated with intentional non-adherence (e.g., signals of negative beliefs, low motivation to take medications). When asked, non-adherent HF patients who became adherent, decided to do so after understanding how poor their prognosis was without medicatons[12], thereby indicating the pivotal role prognostic talk might have on intentional non-adherence. Though prognostic talk was outside the scope of this study, our impression was that doctors avoided prognostic talk, at least in their responses to patient disclosures, they instead emphasised (biomedical) benefits and necessity of using troublesome medications when patients signalled low motivation to use them (See redflag-topic 5,24 and 16 in Table 5 for examples). Previous studies showed that doctors avoid prognostic talk with HF patients when possible[11], which is echoed by patients [12-14 45]. Another explanation may be that doctors are unsure how to handle situations where patients signal that their preferences conflict with HF guidelines. Accommodating patients' wishes by deviating from the best documented regimen for prolonging patients' lives and reduce hospital admissions [3 4] is likely to challenge doctors' professional standards as well as leave them vulnerable to formal complaints.

Finally, we found that one in two medication adherence problems patients disclosed remained unresolved. Often it was as if patients and doctors talked past each other. Problems remained unresolved due to: (1) doctors did not address patients' adherence problem disclosures, or (2) when doctors addressed it, patients signalled that it was against their preferences or unlikely to change their situation. There are many salient reasons for why doctors left patients' disclosures unaddressed, including missing the (significance of the) information, downplaying adherence talk given the institutional setting[46], in addition to those previously mentioned. In this study, we found

that near 40% of patients indicated that doctors' supportive actions were unacceptable to them, leaving their risk of non-adherence unchanged (Table 3 and Table 5 provide illustrative examples). Patients using their agency to negotiate treatment decisions have been studied in other settings [27 47 48], indicating similar levels of unacceptability to doctors recommendations[49]. The conceptual core of "medication adherence" builds on respect for patient autonomy and patients' agreement to doctors' recommended treatment plan[37 50]. Therefore, doctors need training and support to develop skills to negotiate and tailor treatment recommendations, both of which are difficult to master in practice[51-53]. To conclude, we propose three areas to improve adherence talk: (1) Ensure that all doctors have access to patients' current prescriptions in one national database, so that doctors can spend less time reconciliating what is prescribed and more time assessing patients' ability and motivation to adhere, (2) train doctors in patient oriented decision making regarding medications and how to talk to HF patients about their prognosis, and (3) provide doctors with a "toolbox" for how to negotiate and tailor HF treatments to patient preferences.

Strengths and limitations

The main strengths of this study include: (1) Our findings based on authentic consultations, at three selected timepoints when guidelines recommend doctors reconciliate patients' prescriptions and talk about their medication adherence[19 20]. To explore qualitative aspects of adherence talk, a sample of 74 audio-recorded consultations and medical records from 25 patient trajectories have high information power [54]. (2) Access to patients' medical records allowed us to discover doctors' written adherence support not evident from the dialogue. (3) Our coding manual, available on request, is transparent and reproducible[55], allowing others to apply it in other contexts, ultimately discovering which patterns are unique and which are more universal.

Main limitations of this study include: (1) We recruited patients from one hospital ward, limiting generalisability. However, quantification and comparisons were not intended to support any universal claims, they simply represent the distribution and patterns in the material analysed. (2) All percentages in this study must be considered with caution, given that our sample of 25 patients is not a representative sample of the Norwegian heart failure population. Due to our inclusion/exclusion criteria and recruitment process, patients may have been less frail than the average HF patient on the heart ward (MAPINFOTRANS included an extended home interview, and several eligible patients indicated they felt too poorly to receive visitors when declining study participation). However, the sample is relatively close in some descriptive statics to the recent ESC position paper [56]and a Norwegian nationwide study[8] (3) The study situation, especially due to an observer recording the consultation, may have led to more talk about medications and "best practice behaviour" from patient and doctor.[57] (4) The doctor's supportive actions were not vetted by other clinicians for their appropriateness in the given situation.

CONCLUSION

This exploratory study set out to investigate how doctors respond to patients' medication disclosures indicating a potential or ongoing adherence problem, and in turn, how patients respond to the doctors' supportive actions that their disclosures elicited. We found that the doctors were more likely to address patients' adherence problems associated with unintentional non-adherence risks than those associated with intentional non-adherence risks. Even when doctors attempted to address HF patients' medication adherence problems, half of the problems remained unresolved, usually because patients indicated that the doctor's suggestions were against their preference.

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Author contributions

PG, HS, JG, and JM conceptualised the MAPINFOTRANS study and applied for funding and ethics approval. HB, CF, and TBS conducted the data collection. CF and JG conceptualised the present study, analysed the data, and developed the coding manual. TW performed all statistical analyses. CF drafted the manuscript with major contributions to the writing, review and editing from JG, PG, TW, and JM. All authors have read and approved the final manuscript submitted for publication. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

The guarantor (CF) affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned have been explained.

Competing interests: All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: No support from any organisation for the submitted work; HS has received lecture fees from Amgen, Astra Zeneca, Novartis, Novo-Nordisk and Boehringer Ingelheim; PG has received lecture fees from Norwegian Brain Tumor Society, Pfizer and Takeda; JM is a member of Advisory Committee and Board of Trustees for the International Association for Communication in Healthcare EACH (unpaid), and received lecture fees from Oslo Metropolitan University and EACH; no other relationships or activities that could appear to have influenced the submitted work. All other authors have no competing interest to declare

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Patient consent for publication: All participants gave written informed consent before taking part.

Provenance and peer review Not commissioned, externally peer reviewed.

Ethics approval: This study involves human participants, but The Regional Committee for Medical and Health Research Ethics reviewed the project and concluded the project was exempt from review (ref. 273688). The Data Protection Officer at Akershus University Hospital has approved data collection, handling, and storage for MAPINFOTRANS (ref 2021_146). Participants gave their informed consent to participate in the study before taking part.

Data sharing: This study uses audio-recorded authentic medical consultations. We do not have permission to share these with other researchers.

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Legend/Title Figure 1: Flowchart of analytical decisions

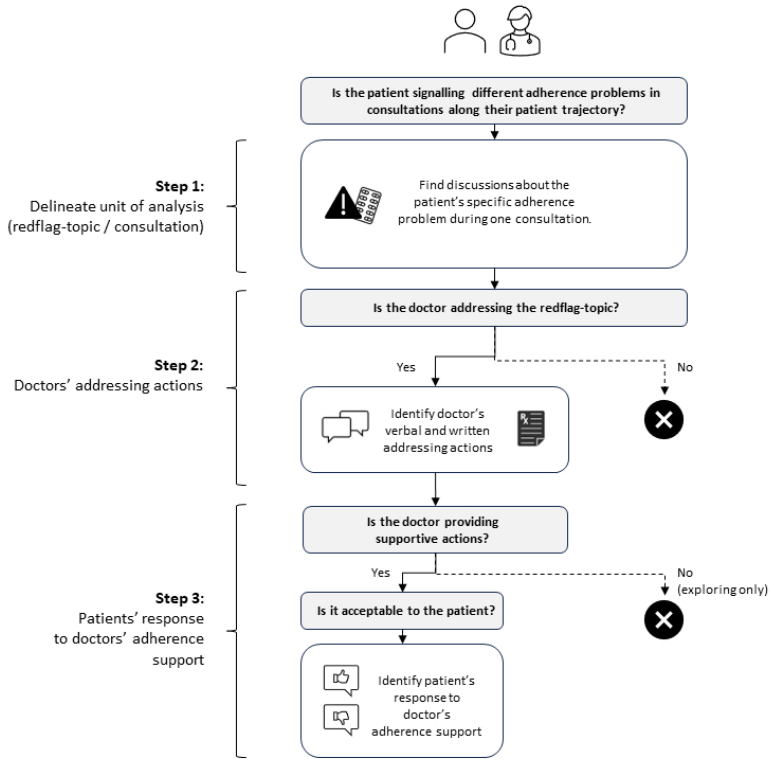

Figure 1 Flowchart of analytical decisions

250x250mm (96 x 96 DPI)

SUPPLEMENTARY MATERIALS

HOW DO DOCTORS ADDRESS HEART FAILURE PATIENTS' DISCLOSURES OF MEDICATION ADHERENCE PROBLEMS DURING HOSPITAL AND PRIMARY CARE CONSULTATIONS? An exploratory interaction-based observational cohort study

Frigaard C, Menichetti J, Schirmer H, et al.

Prepared March, 2025

Content:

FINAL VERSION

S1 MADICI MCI Codebook

PATIENTS' MEDICATION ADHERENCE DISCLOSURES IN CLINICAL INTERACTIONS (MADICI)

MCI OPERATIONAL DEFINITIONS, 2024

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Contents

Key words with definitions

A

ADHERENCE TO MEDICATION is defined as the extent to which a person's behaviour – taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider [1]

ANAPHORIC REFERENCE is a word (e.g., "it", "them", "that") that references something (e.g., a medication, a tool) that was mentioned previously in the dialogue. See full definition in "A Dictionary of Linguistics and Phonetics"[2].

C

CLINICIAN in this study refers to the physician /medical doctor that attends to the patient during the audio-recorded medical interaction. The clinician is either a hospital doctor working on the heart ward, or a general practitioner (GP) working in primary care. The clinician may be a junior, or a senior doctor.

D

DISCONTINUATION occurs when the patient stops taking the prescribed medications, for whatever reason(2). It marks the end of therapy, when the next dose to be taken is omitted and no more doses are taken thereafter (without a prescriber's order). See ABC Taxonomy for context [1].

DOSETT BOX is a container for organisation of several medications that should be taken at the same time, and usually dispensed by patients or non-professional care takers. A Dosett box contains sections so that medications can be dispensed and organised according to when they should be taken (e.g., morning, lunch time, afternoon, evening) and which day (Monday – Sunday).

DRUG refers to a substance intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease. Synonym to "Medication".

E

ELLIPSIS refers to a sentence/utterance where, for reasons of efficiency, its meaning is only possible to recover from a scrutiny of the context. See full definition in "A Dictionary of Linguistics and Phonetics" [2]

I

INITIATION occurs when the patient takes the first dose of a prescribed medication. See ABC Taxonomy for context [1].

IMPLEMENTATION of the dosing regimen, defined as the extent to which a patient's actual dosing corresponds to the prescribed dosing regimen, from initiation until the last dose is taken. See ABC Taxonomy for context [1].

M

MEDICINE is defined as the science of treating diseases with drugs / medications.

MEDICATION refers to a substance intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease. Synonym to "Drug".

MULTIDOSE refers to a professional pharmacy/health care service where all medications to be taken at a certain time (e.g., morning, lunch time, afternoon, evening) are automatically dispensed for the individual patient into sealed plastic pouches and labelled with patient's name, administration time and content. Also called ADD Automatic Dose Dispensing.

N

NON-ADHERENCE TO MEDICATION refers to not starting to use/take a medication (non-adherence in the initiation phase), sub-optimal use compared to the prescribed regimen such as omitting, delaying, or taking too much medication (non-adherence in the implementation phase) or discontinuation by the patient prior to

deprescribing by the clinician (non-adherence in the persistence phase). See ABC Taxonomy and EMERGE guidelines for more information [1 3].

P

PATIENT refers to a person under medical care from a clinician. In this study all patients are 65 years or older, diagnosed with heart failure and were self-managing and living at home at the time of recruitment to the study.

PERSISTANCE is the length of time between initiation and the last dose, which immediately precedes discontinuation. See ABC Taxonomy for context [1].

Rationale

In this analysis we aim to extend our understanding of why patients with heart failure might fail to use their medications through detailed analysis of face-to-face dialogue recorded in authentic medical consultations. This is a sub-study of the MAPINFOTRANS project. MAPINFOTRANS focuses on older patients with heart failure (HF) who are admitted to the hospital and later discharged to their home to be followed up by their general practitioner (GP). MADICI analysis is based on the method Microanalysis of Clinical Interactions (MCI) [4]

Patients must take medications as prescribed to achieve full benefit from the pharmacotherapy. A common problem among heart failure patient is poor medication adherence. It is well documented that the reasons for non-adherence are complex and multifaceted [5]. Among other actions non-adherence can include 1) failure to fill prescriptions 2) failing to initiate treatment at the recommended time 3) taking medications improperly 4) discontinuing medications prematurely. Forgetfulness and misunderstandings may lead to unintentional non-adherence [6 7]. However non-adherence can also be a conscious decision in cases when a patient chooses to modify their prescribed regimen or discontinue their treatment in accordance with their beliefs [6 7].

Although the doctor has no direct access to how the patient is taking medications or experiencing the effects of medication, the doctor has indirect access during interactions with the patient. When patients are admitted to hospital, and later discharged to follow-up in primary care, attending clinicians' need to assess how well the patient is adhering to the current treatment plan. What medications are prescribed, and how they are using them are important for addressing the incident, making changes, and proposing what should happen after they are discharged from the hospital.

How the patient has been handling their medication is invisible to the doctor because it is something that happened previously (before they arrived at the hospital) and somewhere else (at home). Similarly, what the patient plans to do when they get home is not available to the doctor. Besides use of medication, any problems the patient may be having related to their use of medication are something the patient experiences, believes, perceives, worries alone or away from the doctor. Lacking direct access to those experiences, the doctor cannot deal with or address the problems. In these cases, the patient's adherence to the medication plan may be affected.

This is an exploratory observational study on interaction-based data along patient trajectories. We use Microanalysis of Clinical Interaction (MCI)[4] inductively to analyse what patients say about how they use their medications at home. In this analysis we aim to explore the quality of communication about medication adherence in a real-life setting. Data for this analysis consists of audio-recorded consultations with synchronised observation notes supplemented by medication lists from medical records. For each patient three key consultations have been recorded to make it possible to analyse how patients and clinicians talk about medication adherence over time: (1) first heart ward visit in the hospital, (2) discharge visit from the hospital and (3) first follow-up appointment with the GP, usually scheduled no later than 2 weeks from discharge.

Thus, the purpose of this inductive analysis of patient-doctor consultations is to:

(1) identify when patients provide information to their clinicians about their use of prescription medication at home pertaining to their initiation, implementation, or discontinuation, and

(2) count how frequently these utterances occur during a medical consultation, and

(3) describe what kind of information patients provide to their clinicians in these utterances, and

(4) identify how many of these utterances patients initiate without prompts from their clinician. This last purpose is related to how difficult or easy it would be for the patient to disclose something that contradicts the doctor or indicates that they are not following or not intending to follow the plan.

This operational definition provides guidance on how to recognise patient utterances about their use of medications at home that provide opportunities for clinicians to assess and follow up medication adherence.

Ethical permissions

This is one of several studies within the MAPINFOTRANS research project (MAPINFOTRANS), funded by the Norwegian Research Council 31.08.2021. The Regional committee for medical and health research ethics reviewed the project and concluded that the project was exempt from review (ref. 273688). The Data Protection Officer at Ahus has approved data collection, handling, and storage for MAPINFOTRANS (ref 2021_146). All participants gave written informed consent before taking part.

About reuse of this codebook

The operational definitions and examples provided in this codebook are the result of inductive analysis using MCI on 74 audio-recordings with synchronised observation notes from medical encounters in Norway between older patients with heart failure and their doctors in hospital and general practice. Patients and doctors were speaking Norwegian. Analysts working with data collected from different patient groups, different medications, in a different health care context or using video recordings should expect to observe new examples of how the phenomena of interest can be recognised and be open to document and include these.

Phenomena of interest

Medication adherence disclosures in clinical interactions (MADICI) are patient utterances that provide information to doctors about the use of prescription medications at home, pertaining to their initiation, implementation, or discontinuation.

Unit of analysis

In this analysis, the aim is to recognise, define and count how often patients and their doctors talk about the phenomena of interest during a consultation followed by a characterisation of the information provided. This requires a systematic approach to delineate the phenomena of interest into one separate unit of analysis.

For this analysis, one (1) unit of MADICI is defined as all utterance(s) within one speech turn. Depending on how long the patient holds the turn, one unit of MADICI can contain several utterances or as little as one word as a response to a question.

Conversation analytic knowledge on turn design has informed this analytic decision ("The handbook of conversation analysis", Stivers & Sidnell, 2014).

For MADICI coding the analyst must listen to the audio-recordings to identify turns and organise transcripts so that one turn is coded as one unit; In face-to-face dialogue, the interlocutors take turns to talk. While the speaker talks it is common that the addressee provides feedback that signals that they are listening and wants the speaker to continue with their story. These utterances are called "continuers" or "backchannels" and are typically heard and can appear in the transcripts as "mm", "yes", "no", "and…".

A speech turn can end in several ways:

- The speaker stops talking by themselves, often leaving an audible gap in the conversation allowing the other person to take their turn.
- The addressee interrupts and takes over the initiative in the dialogue.
- The addressee asks a question.

The addressee can also signal that they want the speaker to continue with their story by providing space by keeping silent.

Example of transcript organised by speech turns

In the following transcript it is possible to see how the dialogue alternates between the doctor and the patient; they take turns providing information. Backchannel responses may be heard on the audio-recording but are not transcribed. It is possible to see how previously shared information becomes "common ground" and how this affects the dialogue. In Line 14 the patient utterance consists of only one word ("one"). However, interpreted in the context of the dialogue it provides information to the doctor about how many tablets of bumetanide the patient currently takes.

Line	Speaker	Transcript of audio-recorded consultation 1119/F [observation notes]
3	GP	So you have been readmitted I see. I have received a discharge letter from the hospital.
4	Patient	Yes, the pulse became too fast again, so… but nok like it was when I was here with you that time.
5	GP	No. And you were not that brilliant when you were readmitted now either.
6	Patient	No.
7	GP	You were heavy breathing and…let's see, only to see the conclusion of… from the discharge letter...[GP reads on the computer monitor] Yes, you received a couple of new medications.
8	Patient	Yes [Laughs] I have plenty of medications.
9	GP	Yes, you have received two new ones, and then…because your potassium levels were low, and then you have also…
10	Patient	I have it here too [patient shows discharge letter in paper version to the doctor]
11	GP	Yes, and so you have… and so you have received…yes it is the same one that I have I believe. And so you have been given Burinex that is kind of a diuretic medicine. It is for heart failure.
12	Patient	Yes, but she has given me two a day, and that does not work you know. No so …I take one when I am home. And if I am doing something then I cannot take it.
13	GP	Yes but then…what it says here is 1 tablet in the morning and one at 1 pm. Two a day yes. But you… how many do you take now?
14	Patient	One
15	GP	One. One in the morning?
16	Patient	Yes, when I…you know I sleep abit long, so… I take one Burinex around noon. And it works very well that one, so…
17	GP	Yes. How do you feel now?

MADICI coding of this transcript, with analytical decisions, is provided on page 23 and 24. The transcript is translated from Norwegian.

Preparation for analysis

Materials

Patients selected for this study were 65 years old or older, diagnosed with heart failure, living at home and responsible for taking their own medications without any daily support from professional caregivers. Patients were allocated a 4-digit code that was used as a unique identifier (StudyID). The 4-digit code (from 1001 and onwards) was allocated to patients eligible for the study in chronological order prior to recruitment.

This is an analysis of consultations between patients and their clinicians collected along patient trajectories at (1) first heart ward visit in hospital, (2) discharge visit from hospital and (3) follow-up visit with GP.

Analysts require access to the following data to conduct the analysis:

1. Audio-recordings of patient-clinician consultations collected in their natural setting. Observation notes providing description of the context, any hand-outs and unspoken activities.
2. Transcript in verbatim of the consultations with any relevant notes from the observation notes added. Backchannel utterances may be omitted (typically heard as "mm", "yeah", "yes", "no"), please refer to "unit of analysis" for rationale.
3. Current prescriptions from medical records matching the audio-recorded consultation.

Preparation of data

- Copy and paste the transcript (with relevant observation notes added) into an Excel worksheet. Copy transcripts from different consultations with the same patient into separate worksheets.
- Label each worksheet with a unique identifier that communicates which patient and which consultation the transcript refers to, i.e., 1244V.
    - Patient StudyID (4-digit code)
    - V, U or F to identify which consultation:
        V= (1) first heart ward visit in hospital
        U= (2) discharge visit from hospital
        F= (3) follow-up visit with general practitioner
- Number all speech turns in the worksheet (e.g., 1244/V/1, 1244/V/2, 1244/V/3 …)
    - Keep numbering consistent throughout analysis.
    - If new utterances are added later, add letters instead of changing numbers: 5a, 5b,
- Clearly label with speaker in one column
- Index/add time in the audio-recording in one column at regular intervals to make it easier to find sections.
- Add hyperlink to audio from the interaction to enable listening to the audio during analysis.
- Give each patient a memorable pseudonym, which you will put in the " NAME" sheet. Give each interaction a short and description of content, which you will put in the " NAME" sheet.
- Insert top-row from previously completed analysis sheet, or template (preserve column width to save time).
- Highlight sections of speech where the patient and clinician talk about medication with a chosen cell colour (e.g., orange).

Factors influencing patient-doctor interactions.

Analysts need to be aware how communication may be influenced by other factors; in addition to patients' current wellbeing and health literacy, there are other factors that influence how patients and doctors talk to each other and show agency. These include familiarity with the situation, deontic rights, and epistemic rights. Table 1 displays the first author's preconceptions of how these factors might influence the dialogue in patient-doctor interactions.

Relevant reading: "Orientation to epistemics and deontic in treatment discussions" [8] and "Communicating (with) care" [9]

Table 1. Influencing factors

	Patient with heart failure	**Clinician Doctor on heart ward**	**Clinician – General Practitioner**
Role	Person suffering from heart failure in need of/seeking medical care.	Professional clinician who can provide specialised medical care in acute or severe situations.	Professional clinician who can provide medical care in a primary care setting and refer to specialised health services and homecare.
Emotional proximity	May be distressed and frightened	Distant, professional	Semi-distant, professional
Familiarity with situation	Likely low, extraordinary situation	High, every day, routine work	High, every day, routine work
Epistemic rights	Immediate access to self; knowledge about own beliefs, experience and actions connected to symptoms, prognosis and medical history and general impact on life.	Medical specialist in cardiology, health care system, potential access to patient records and prescription history via personal number. Knowledge to assess and support patient's health condition	Medical specialist in general practice, health care system, likely access to patient records and prescription history via patient number. Knowledge to assess and support patient's health condition
Deontic rights	Rights to accept or decline available medical treatment, home care assistance and use of prescribed medications.	Rights to prescribe, change, and de-prescribe medications. Rights to order specialised medical treatment in the hospital, discharge patient to home, initiate home care services.	Rights to prescribe, change, and de-prescribe medications. Rights to refer patient to specialised treatment in primary and secondary care, including home care and dose-dispensed, pre-packaged medications (multidose)
Responsibility	(Moral – for self)	Professional. Short term responsibility for patient. Institutional responsibility to the hospital and national health care system.	Professional. Long-standing responsibility for patient. Institutional responsibility to GP-clinic and national health care system.

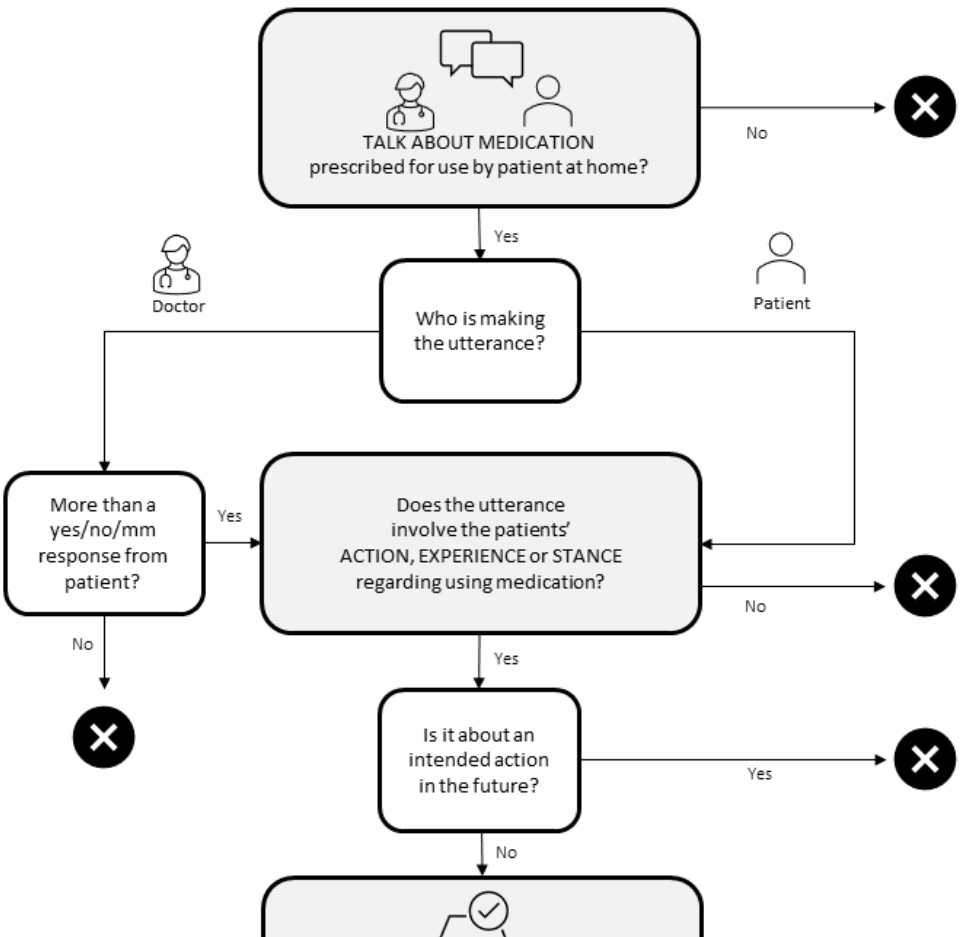
Overview of analytic steps

Step 1: Identification; build a collection of utterances that fulfil criteria for MADICI.

The first step of the analysis is to build a collection of patient utterances that meet essential criteria for MADICI. The analyst starts by listening through consultations with support from transcripts and medical records to identify sequences where there is talk about medications prescribed for use at home. Then the analyst uses the MADICI Decision-tree to identify and select utterances that meet both criteria defined for the phenomena of interest. These criteria are discussed in detail in the section Operational Definitions (page 13).

After identifying all MADICI in the dataset the analysis continues with characterisation of the content in each MADICI (Step 2).

Figure 1: MADICI Decision-tree



Step 2: Characterisation of MADICI

The second step of the analysis is to characterise each MADICI. The analyst uses dichotomous coding to code the content in each MADICI (unit of analysis) for six different types of *red flags* and how the MADICI was initiated. In addition, the analysts considers whether the MADICI is clearly linked to specific medication(s), and when referenced makes a note of which (by specifying name of active ingredient).

Characterisation of content into six different types of red flags is informed by the PaPA framework [10] for information indicating a potential risk to adherence (type 1-3), while problems described as non-adherence in the initiation, implementation and discontinuation phases of adherence (type 4-6) are informed by the ABC Taxonomy [1] and EMERGE Guidelines [3].

Table 2. Characterisation of red flags in MADICI

	What kind of red flags for non-adherence is provided in the MADICI?
TYPE 1	Indication of potential adherence risk specifically due to *patient's perceptions (e.g., medication necessity beliefs, concerns, and emotions).*
TYPE 2	Indication of potential adherence risk due to practicalities, specifically due to *patient's difficulties identifying or keeping overview of medications (e.g., resources and capabilities).*
TYPE 3	Indication of potential adherence risk due to practicalities, specifically due to *patient's difficulties dispensing own medications.*
TYPE 4	Indication of non-adherence in the *initiation phase.*
TYPE 5	Indication of non-adherence in the *implementation phase.*
TYPE 6	Indication of non-adherence in the *persistence phase.*

Operational definitions

Step 1: Identification of MADICI

For the first step of analysis, the analyst should use audio-recordings of the consultations to hear precise timing of speech and its prosody together with transcripts for reference. Analytical decisions are recorded in Microsoft Excel for reference and transparency. It is important to interpret utterances in their sequential context in order to consider the clinicians utterances together with the patient utterances.

This analysis assumes that patients in the dataset are living at home and responsible for taking their own medications without daily support from professional caregivers. It is important in this first step to eliminate utterances that are about intentions to do something in the future, since we are interested in current and past actions or beliefs. In addition is it important to eliminate dialogue pertaining to medications administered in hospital or in a primary care clinic (e.g., vaccines).

It is an advantage that the analyst is familiar with names and visual appearance of medications and tools for administration.

Two essential criteria

The analyst can recognise and identify MADICI in the dialogue by observing two essential elements in the utterance:

> **(1) it must refer to medication prescribed for use by the patient at home, AND**
>
> **(2) it must involve the patients' action, experience, or stance regarding the use of their medication(s).**

Criterion 1: The utterance refers to medication prescribed for use by the patient at home

There are several ways the analyst can identify that the utterance is about medication. Talk about medications is recognisable from brand and generic names, colloquial terms, patients' visual descriptions of their medications or mispronunciations, or tools to administer medications at home. After medications or tools had been introduced in the dialogue, subsequent MADICIs can be identified when they include anaphoric references to the medication or the experience of taking medication (e.g., "it", "them", "one").

Guide to analyst:

1. The reference to medication can occur in either the patient or the clinician utterance.
2. **Table 3** (page 17) provides a guide for how to identify Criterion 1 with definitions.
3. Verify that the medication referred to in the utterance has been prescribed for use at home by checking against medical records.
4. Exclude all utterances referring to medications administered by health care providers in hospital, GP-offices, or the patients' home.
5. Exclude over-the-counter medications (OTC), herbal remedies and vitamin supplements as they are available without a prescription.
6. Record how criterion 1 was identified in the coding sheet. An example of a filled in coding sheet is provided on page 23.

Criterion 2: It is about patients' actions, experience, or stance regarding use of medication.

For utterances that are about use of medications at home, the analyst can identify patient utterances fulfilling Criterion 2 then it includes information about patient's (1) action, (2) experience or (3) stance pertaining to initiating, implementing, or discontinuing their medications at home.

Utterances provided by next of kin can be considered when they speak on behalf of the patient and the utterance fulfils essential criteria.

Guide to analyst:

1. The analyst needs to consider utterances by doctors since they often contain references to medications or provide information fulfilling Criterion 2, to which patients could respond. Therefore, utterances by doctors and patients are always analysed in sequential context.
2. **Table 4** (page 19) provides a guide for how to identify patient utterances that fulfil Criterion 2.
3. Exclude two types of patient utterances that do not fulfil Criterion 2: (1) patient utterances about intentions to do something in the future since we are interested in current and past medication taking behaviour (e.g., "But now I will go down to two tablets on Wednesday"), and (2) utterances limited to a "yes", "no", "mm" responses.
4. Record how Criterion 2 was identified in the coding sheet. Since the analytic unit may contain one utterance or a sequence of utterances one MADICI may meet one or several Criteria 2. They are not mutually exclusive. Record all. An example of a filled in coding sheet is provided on page 23.

Step 2: Characterisation of MADICI

In step 2 we are interested in identifying patient contributions that indicates a problem with adherence. We also want to know if they are linked to specific medications to document which particular medications patients struggle to use. This information is of value for prescribers who may opt to use other alternatives in the future. How each MADICI is initiated is of interest to explore how active patients are to bring forward information about non-adherence. It is also related to how difficult or easy it would be for the patient to disclose a medical misdeed or something that contradicts the doctor.

With the exception of Step 2.2. the analyst should again use audio-recordings of the consultations to hear precise timing of speech and its prosody together with transcripts for reference. Create additional columns in Microsoft Excel to (1) record analytical decisions, and (2) to calculate frequencies (tip: summarise coding at the top and activate "Filters" under Data in Microsoft Excel to aid quantitative reporting of results)

Guide to analyst for dichotomous coding of content

- **Step 2.1 Identify MADICI initiated by patients without prompts from their doctor:** Use audio-recording with transcript to assess whether the MADICI was initiated by the patient without a prompt from their doctor. Definitions are provided below. Record dichotomous code in Excel sheet (Unprompted by doctor =1 / Prompted by doctor = 0).
- **Step 2.2 Identify MADICI referring to specific medications:** Use transcript and inspect Criterion 1 from Step 1; Record if the MADICI refers to specific medication(s) or not. Record code in Excel sheet (Specific medication(s) = 1 / Not; e.g. medications in general, unidentifiable =0). Record generic names of all specific medications the MADICI refers to in a separate column.
- **Step 2.3 Identify red flags for non-adherence:** Use audio-recording (prosody especially important for this analysis) with transcript and assess the content in each MADICI for all 6 red flags; they are not mutually exclusive. Record dichotomous code in Excel sheet (presence = 1 / absence = 0). Table 5 provides an overview of the six types of red flags for non-adherence.

An example of a filled in coding sheet is provided on page 24.

Step 2.1 Guide to analyst to identify unprompted MADICI

There are two ways the analyst can recognise whether the MADICI was initiated by the patient without a prompt from their doctor. These should be coded as "1", and include:

(1) when the information is provided spontaneously "out of the blue" by the patient
   a. after an audible pause in the conversation the patient provides new information not requested by the doctor
   b. did not logically follow from the flow of the conversation.

(2) When the patient stayed on the same topic but adds details and steered the conversation in a new direction.

The analyst can recognise MADICI prompted by doctors in three different ways. These should be coded as "0" and include:

(1) It is a logical and relevant response to a question or statement by the doctor; information is invited by the clinician.
(2) MADICI provided by the patient following a question from the clinician asking if there are any other questions (e.g., "so do you have any other questions for me before we finish?", "is there anything else?").
(3) MADICI provided by the patient while the patient reads from their discharge note/written information given from the doctor for the patient to read through (check observation notes)

Examples with transcripts of unprompted and prompted MADICI are provided on page 46.

Step 2.2 Guide to analyst to identify specific medications

Reference to specific medications include all instances where it is clear from the dialogue which medication the MADICI refers to, including medications identified by patient's visual description, mispronounced medication names and situations where the patient is presenting a list or box of medications.

Step 2.3 Guide to analysist to identify red flags for non-adherence

Tip: Add a column in the coding sheet dedicated to record analysts' impressions and analytical decisions.

Coding of MADICI for red flags should be done in their sequential context but weigh heavily on what was said by the patient and how the information was delivered (tone of voice, prosody). Patient's intentions or motivation to disclose information should not be questioned; analytical decisions should be based on observable behaviour and speech acts.

Patient utterances that are not considered as red flags for non-adherence (code as "0") include:

Type 1	Narratives of side-effects that have been dealt with (in the past).
Type 2	When the patient is mispronouncing medication names or uses a visual description but does not themselves express any frustration or problems with it.
Type 3	Use of professional services, i.e. multidose
Type 4	When the patient reports not using a medication prescribed for intermittent use.
Type 5	When the patient report having intentionally discontinued taking the medication (=type 6)
Type 6	When the medication has been deprescribed and the patient utterance functions to verify that this change has been implemented.

Table 3. Identification of MADICI Criterion 1

Criterion 1 fulfilled when the utterance includes:		Rationale	Detailed example with transcript provided (page)
Specific medication	Specific drug name according to national formulary, e.g., Brand name, e.g., "Eliquis" Generic name, e.g., "apixaban"	All medications have a generic name and a brand name. Both may be used to reference a medication.	1179/V/33-34 (p.30) 1119/F/86-87 (p.31) 1228/V/97-100 (p.36) 1040/F/469-474 (p.37)
A class of medications	A class of medications according to national formularies / ATC-system / medical source books, including colloquial terms e.g., "betablocker", "diuretic", "anticoagulant"	Specific medications belong to a class of medications within an internationally recognised hierarchical structure. It is common to reference medications by class.	1179/V/5-6 (p.39)
Some medications	Reference to medications by indication, including colloquial terms, e.g., "Medication for hypertension", "Bloodthinner", "Watermedicine", "Cholesterol medicine"	Patients and clinicians may use the indication to reference medications. Be aware of lay-man's terms for diagnosis.	1213/F/15 (p.34) 1037/F/39-41 (p.35) 1037/U/72 (p.37)
Medication in general	General terms for medications, including colloquial terms e.g., "Tablets", "my medicines", "pills"		1033/F/79-82 (p.26) 1213/F/126-129 (p.32) 1149/F/61-62 (p.34) 1040/F/547-549 (p.42) 1213/F/17 (p.44)
Tools	Reference to tools or systems used to organise intake of medications in the right dose at the right time, e.g., 1. manual or automatic dose dispensing tools ("dosett", "weekly pill box", "dosett", "multidose"), inhalation chamber, tablet cutters, pillbox. 2. Reminders (e.g., alarms) 3. Medication lists on paper/computer	Patients may use several tools in connection to organise and ensure they take their medications according to the prescriptions at the right time.	1179/V/11-12 (p.30) 1037/F/39-41 (p.35) 1218/V/105-112 (p.40) 1040/F/641-643 (p.45) 1040/F/670 (p.45)

Mispronunciation of medication	A distorted word that the analyst interprets as a mispronounced medications name. e.g., "Burinetti" = Burinex = bumetanide "Elifix" = Eliquis = apixaban	Medications have complex names that are difficult to recollect and pronounce for lay-men and professionals alike. This can lead to "creative" and distorted variations in audio-recorded conversations about medication. Medical records should be used to verify analysts' assumption.	1004/V/10 (p.39)
Visual description of medication	A visual description of medication(s), medication container or tools, **e.g.,** "The blue one", "the large one", "the white pill"	Visual descriptions of medications may be used to refer to medications, either by using shape, consistence or colour of the formulation or the container. Medical records and databases with photos of medications should be used to verify analysts' assumption. Tools used to administer medications are also frequently referenced by description rather than by their formal name.	1179/V/63-64 (p.29) 1155/V/64-66 (p.32)
Anaphoric references	An anaphoric reference to medication(s) or tools, e.g., "it", "that"	Names of medications or tools may be substituted with anaphoric references as the dialogue evolves. [2]	1176/U/9-10 (p.26)
	An anaphoric reference *to the experience* of using a medication or tool, e.g., "it", "that"	The experience of using medications or tools may be substituted with anaphoric references as the dialogue evolves. [2]	1179/F/5-8 (p.28) 1004/F/119-120 (p.43)
Elliptical	No reference in the patient utterance but based on the context the utterance is clearly about medication.	During the dialogue speakers may omit the name/anaphoric reference to the medication altogether, but based on context the utterance the analyst is able to point to/argue for why it is clearly about medication. [2]	1176/F/66-67 (p.27) 1119/F/13-14 (p.27) 1149/F/179-186 (p.31) 1056/F/34-37 (p.33) 1228/V/97-100 (p.36) 1036/F/27-30 (p.38)

Table 4. Identification of MADICI Criterion 2

	In utterances about medications, Criterion 2 is fulfilled when:		**Detailed example with transcript provided (page)**
ACTION	The patient is the agent and the verb is an action verb.	With the utterances referring to medications the utterance could be included if the patient is the agent* (e.g "I") AND the verb is an action verb indicating taking, or not taking, medication: e.g. "use", "take", "swallow", "am on", "begin", "remember", "stop", "put", "fill", "forget", "omit". Utterances made by next of kin can also be considered if they are speaking on behalf of the patient (e.g., "him", "she"). **Exclude** when the verb refers to the patient in a passive receptive role (e.g., "received", "was given", "stand on", "have", "was prescribed", "was put on")	Examples fulfilling criteria; include: 1033/F/79-82 (p.26) 1176/U/9-10 (p.26) 1179/F/5-8 (p.28) 1213/F/62-63 (p.29) 1004/F/119-120 (p.43) Contrasting example; exclude: 1179/V/63-64 (p.29) 1179/F/33-34 (p.30)
	A reference to patients' actions with medications has been provided by the clinician and the patient responds with more than a "yes", "no", "mm".	The patient can be considered the agent through the use of pronouns (e.g., "you" in clinicians' utterance) AND the verb is an action verb indicating taking, or not taking, medication.	Examples fulfilling criteria; include: 1176/F/66-67 (p.27) 1119/F/13-14 (p.27) Contrasting example; exclude: 1179/V/11-12 (p.30)
ACTION IMPLIED	The patient requests a repeat prescription	Patient can ask for a prescription, or accept doctors' offer of a renewed prescription, which can provide the doctor with the suggestion that the patient has used that medicine, has run out, and plans to use it in the future. **Exclude** when the patient requests a prescription for a medication that has not previously been prescribed. **Exclude** when clinician checks and reports that valid prescriptions are available.	Example fulfilling criteria; include: 1119/F/86-87 (p.31) Contrasting example; exclude: 1149/F/179-186 (p.31)

ACTION IMPLED (continued)	The patient asks about drug combinations (drug interactions)	Patient can ask whether it is safe or possible to combine two or more medications, which can provide the doctor with information of other medications the patient is using, either regularly or when needed, and plans to use them together in the future.	Example fulfilling criteria; include: 1213/F/126-129 (p.32)
	The patient talks about manipulation of medication doses.	Patients talking about manipulation of medication doses (e.g., halving of tablets, crushing of tablets, dissolving tablets, diluting medicines) can provide the doctor with information of how they are administering their doses of medications, which doses they are using, and practical issues connected to using medications at home.	Example fulfilling criteria; include: 1155/V/64-66 (p.32)
	The patient asks if a dose can be adjusted	Implies that the patient is currently using the medication.	Example fulfilling criteria; include: 1056/F/34-37 (p.33)
	The patient asks if he can stop taking a medication	Implies that the patient is currently using the medication.	Example fulfilling criteria; include: 1213/F/15 (p.34)
	The patient questions changes to current prescriptions	Implies that the patient is currently using the medication.	Examples fulfilling criteria; include: 1149/F/61-62 (p.34) 1037/F/39-41 (p.35)
	The patient challenges a statement/question by the clinician that assumes the patient is using a medication	Implies that the patient is currently using the medication.	Example fulfilling criteria; include: 1228/V/97-100 (p.36)
	The patient asks for a second opinion or the rationale for using a medication currently in use	Implies that the patient is currently using the medication. **Exclude** when the patient is passing along a request to revise a medication from another clinician without taking "ownership" to the request himself.	Example fulfilling criteria; include: 1037/U/72 (p.37) Contrasting example; exclude: 1040/F/469-474 (p.37)

EXPERIENCE	The patient reports a positive or negative experience with medications	A patient reporting their positive or negative experience can by implication, reveal the patient's action with the medication and should be included. Recognised in patient utterances about medications that include information about patient's experiences such as positive or negative symptoms, side-effects, (expected or unexpected) effect or lack of effect. **Exclude** when patient and clinician are exploring symptoms as part of the illness history and there is no clear connection to (effects of) medication.	Examples fulfilling criteria; include: 1036/F/27-30 (p.38) 1179/V/5-6 (p.39) 1004/V/10 (p.39) Contrasting example; exclude: 1119/F/89 (p.41) 1085/F/30-31 (p.41)
	The patient reports experience with tools or systems used to dispense, manipulate, or organise medications at home	A patient reporting their positive or negative experience with tools or systems to organise medication intake can, by implication, reveal the patient's action with the medication and should be included.	Example fulfilling criteria; include: 1218/V/105-112 (p.40)
STANCE	The patient discloses a stance or a point of view about medications	Utterances about medications that include a positive or negative stance (e.g., belief, perception, point of view, opinion) should be included. The stance can arise from an experience, but not necessarily, and is therefore a separate criterion.	Examples fulfilling criteria; include: 1040/F/547-549 (p.42) 1213/F/17 (p.44) 1040/F/115; special case: next of kin utterance (p.42) Contrasting example; exclude: 1033/V/120-121 (p.44)
	The patient discloses a stance or a point of view about tools or systems used to dispense, manipulate, or organise medications at home	Utterances about medications that include a positive or negative stance (e.g., belief, perception, point of view, opinion) towards tools or systems for organisation of medication intake should be included. The stance can arise from an experience, but not necessarily, and is therefore a separate criterion.	Example fulfilling criteria; include: 1040/F/641-643 (p.45) 1040/F/670 (p.45) 1004/F/119-120 (p.43)

Table 5: Red flags for non-adherence in MADICI

	What kind of red-flag for non-adherence is provided in the MADICI?	Defined and coded as present when:	Examples (patient-pseudonym, setting)
TYPE 1	Indication of potential adherence risk specifically due to *patient's perceptions (e.g., medication necessity beliefs, concerns, and emotions).*	The MADICI includes patient's concerns, worries, fears, or a negative stance towards: - side-effects, - the volume or choice of medications, or - using medications generally.	"But it [taking bumetanide] is no fun. I cannot get anything done before noon, I was about to say." (1004/F/31m) "But if I'm in a normal condition and there are side-effects then I would like to remove it [cholesterol lowering medication]." (1213/M/33m)
TYPE 2	Indication of potential adherence risk due to practicalities, specifically due to *patient's difficulties identifying or keeping overview of medications (e.g., resources and capabilities).*	The MADICI indicates that the patient: - is unsure or unable to name own medications, or - cannot verify medications taken based on descriptions provided by doctor.	"I do not remember. It has been a lot back and forth with changing out old medications and getting some new ones and the like, so it is not clear to me."(1179/V/8m) "Its not exactly easy names on those things and I know that I have an anticoagulant and…I do not remember…I just take those that I have." (1231/V/34m))
TYPE 3	Indication of potential adherence risk due to practicalities, specifically due to *patient's difficulties dispensing own medications.*	The MADICI provides information about relying on assistance from next of kin with medications to ensure correct dispensing.	"It is *girlfriend's name* … she does it [dispensing medications] and puts into the boxes according to that list that we have. So if I have that bumetanide-tablet, that it is on that list there, then I probably take it." (1037/F/111m) "That [dispensing in weekly pill organiser] is what I'm struggling with, because I called the home-nurse-team if they could come and dispense. But they did not have enough capacity, so I'm sitting now with the tongue in my mouth as I am dispensing." (1212/F/47m)
TYPE 4	Indication of non-adherence in the *initiation phase.* (e.g., the patient describes not collecting the first medication pack from the pharmacy or not starting to take a new medication).	The MADICI provides information about the patient not taking the first dose of a medication prescribed for regular use	"I was supposed to start on tablets for that [osteoporosis] too, but I cannot stand…I cannot stand more tablets." (1149/F/226) "Never been using those [prescription strength tablets with calcium with vitamin D], so that is wrong." (1149/F/227m)
TYPE 5	Indication of non-adherence in the *implementation phase.*	The MADICI provides information about the patient omitting, delaying, or taking too many doses of medication	"Pfh… I forget it [taking medications] probably once a week." (1228/F/246m)) "Because I struggled to fall asleep so that I sat a lot in the sofa at home and fell asleep. And then when I got out of bed 3 or 4 o'clock at night then it was kind of not the time to take that tablet. And then I forgot to take it afterwards." (1241/V/104m))
TYPE 6	Indication of non-adherence in the *persistence phase.*	The MADICI provides information about the patient intentionally discontinuing a medication that has not been deprescribed.	"I've stopped taking that, because that one [bumetanide]… I could not use it."(1004/V/25m)) "That one [chlorprotixene] I took away myself when I was on the *island*." (1176/U/10m)

Table 6a. Coding sheets (Identification of MADICI, step 1)

Line	Speaker	Transcript of audio-recorded consultation 1119/F [observation notes]	MADICI	MADICI-ID	Criteria 1	Criteria 2
3	GP	So you have been readmitted I see. I have received a discharge letter from the hospital.				
4	Patient	Yes, the pulse became too fast again, so… but not like it was when I was here with you that time.				
5	GP	No. And you were not that brilliant when you were readmitted now either.				
6	Patient	No.				
7	GP	You were heavy breathing and…let's see, only to see the conclusion of… from the discharge letter…[GP reads on the computer monitor] Yes, you received a couple of new medications.				
8	Patient	Yes [Laughs] I have plenty of medications.	1	1119/F/8m	medications	Patient's stance
9	GP	Yes, you have received two new ones, and then…because your potassium levels were low, and then you have also…				
10	Patient	I have it here too [patient shows discharge letter in paper version to the doctor]				
11	GP	Yes, and so you have… and so you have received…yes it is the same one that I have I believe. And so you have been given Burinex that is kind of a diuretic medicine. It is for heart failure.				
12	Patient	Yes, but she has given me two a day, and that does not work you know. No so …I take one when I am home. And if I am doing something then I cannot take it.	1	1119/F/12m	"It" is an anaphoric reference to Burinex in Line 11	I = patient is the agent, and the verb (take) is an action verb, Patient experience and stance (that does not work, if I'm doing something then I cannot take it)
13	GP	Yes but then…what it says here is 1 tablet in the morning and one at 1 pm. Two a day yes. But you… how many do you take now?				
14	Patient	One	1	1119/F/14m	"One" is an elliptical reference to "bumetanide tablets"	Respons to doctors question in Line 13 referring to the patient (you) is the agent and the verb is an action verb (take)
15	GP	One. One in the morning?				
16	Patient	Yes, when I…you know I sleep abit long, so… I take one Burinex around noon. And it works very well that one, so…	1	1119/F/16m	Burinex (bumetanide), "it" and "that one" are anaphoric references to Burinex in the same MADICI	I = patient is the agent, and the verb (take) is an action verb, Patient experience (it works very well that one)
17	GP	Yes. How do you feel now?				

Table 6b. Coding sheets (Characterisation of MADICI, step 2)

Line	Speaker	Transcript of audio-recorded consultation 1119/F [observation notes]	Reference to specific medication?	Which one?	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Unprompted by doctor?
					(Information included =1, absent = 0)						
3	GP	So you have been readmitted I see. I have received a discharge letter from the hospital.									
4	Patient	Yes, the pulse became too fast again, so… but not like it was when I was here with you that time.									
5	GP	No. And you were not that brilliant when you were readmitted now either.									
6	Patient	No.									
7	GP	You were heavy breathing and…let's see, only to see the conclusion of… from the discharge letter…[GP reads on the computer monitor] Yes, you received a couple of new medications.									
8	Patient	Yes [Laughs] I have plenty of medications.	0		1	0		0	0	0	0
9	GP	Yes, you have received two new ones, and then…because your potassium levels were low, and then you have also…									
10	Patient	I have it here too [patient shows discharge letter in paper version to the doctor]									
11	GP	Yes, and so you have… and so you have received…yes it is the same one that I have I believe. And so you have been given Burinex that is kind of a diuretic medicine. It is for heart failure.									
12	Patient	Yes, but she has given me two a day, and that does not work you know. No so …I take one when I am home. And if I am doing something then I cannot take it.	1	Bumetanide	1	0	0	0	1	0	1
13	GP	Yes but then…what it says here is 1 tablet in the morning and one at 1 pm. Two a day yes. But you… how many do you take now?									
14	Patient	One	1	Bumetanide	0	0	0	0	1	0	0
15	GP	One. One in the morning?									
16	Patient	Yes, when I…you know I sleep abit long, so… I take one Burinex around noon. And it works very well that one, so…	1	Bumetanide	0	0	0	0	1	0	0
17	GP	Yes. How do you feel now?									

Type 1: The MADICI provides information about patient's concerns, worries, fears, or a negative stance, Type 2: The MADICI indicated the patient is unsure or unable to name own medications, or cannot verify medications taken based on descriptions provided by doctor, Type 3: The MADICI provides information about relying on assistance from next of kin with medications to ensure correct dispensing, Type 4: The MADICI provides information about the patient not taking the first dose of a medication prescribed for regular use, Type 5: The MADICI provides information about the patient omitting, delaying, or taking too many doses of medication, and Type 6: The MADICI provides information about the patient intentionally discontinuing a medication that has not been prescribed. Unprompted by doctor when provided (1) "out of the blue" or (2) when the patient stays on the same topic, but mid-utterance adds information and steers the conversation in a new direct

Detailed examples with transcripts

for how to recognise utterances to include or exclude

Patients' actions

1033/F/79-82 (Medications in general/ The patient is the agent and the verb is an action verb)

In this example the patient provides information to the GP about her intake of medications prescribed from the hospital a few weeks ago. The patient utterance in Line 80 fulfils both criteria and should be included: (1) The utterance is about medications as it includes "medisiner"/"medications", and (2) it is about the patients' action because the patient refers to herself as the agent ("jeg"/"I") and uses an action verb ("ta"/"take").

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
79	GP	Noen andre spørsmål som har dukket opp i etterkant? **Any other questions that have popped up afterwards?**
80	Patient	Nei ikke egentlig, for jeg tar nå de medisinene jeg skal ta til de riktige tidene. Og jeg prøver å holde det akkurat sånn innenfor… 40 minutter innenfor, morgen og kveld da. Klokka 8 om morgenen og klokka 20 om kvelden. **No, not really, because now I take the medications I should take at the correct times. And I try to keep it just within... within 40 minutes morning and evening. 8 o'clock in the morning and 8 o'clock in the evening.**

1176/U/9-10 (Anaphoric reference/ The patient is the agent and the verb is an action verb)

In this example the patient discloses to her hospital doctor that she does not take a medication since she had stopped taking a specific medication prior to hospital admission. Checking against medical records the medication was still prescribed as a regular medication on admission to hospital, indicating intentional discontinuation. The patient utterance in Line 10 fulfils both criteria and should be included: (1) "den"/"it" is an anaphoric reference to the medication Truxal (brand name of chlorprotixene) in Line 9, and (2) and the patient discloses her actions with the medication by referring to herself as the agent ("jeg"/"I") and the action verb ("tok bort"/"took away").

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
9	Hospital doctor	Men så har du fått… og så har vi sluttet med… Den Truxalen husker du, det e vi ferdig med. Så den har vi trappet ut og den trenger du ikke å bruke. **But then you have received…, and then we have stopped with… That Truxal you remember, that one are we finished with. So that one have we reduced and you do not need to use it.**
10	Patient	Den[Truxal] tok jeg egentlig bort selv da jeg var på *ØY*. **That one [Truxal] I took away myself when I was on the *ISLAND***

1176/F/66-67 (Elliptical/Response to question by doctor where patient is the agent and the verb is an action verb)

In this example the patient tells her GP (non-native Norwegian speaking) when she started to use the newly prescribed medications. Only by considering the utterance by the GP is it possible to recognise that the patient utterance is about medications, since the patient utterance by itself does not include any reference to medications. The patient utterance in Line 67 fulfills both criteria and should be included: (1) Elliptical reference to medications/prescriptions mentioned in Line 66, and (2) it is about the patient's action because it is a response to a question where the patient is the agent ("du"/"you") and she uses an action verb ("begynte"/"began").

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
66	GP	Så det som jeg har også sett er at du har fått medisiner, de [sykehuslegene] har skrevet reseptene. Du har begynt med de medisiner allerede? **So what I have also seen is that you have been given medications, they [hospital doctors] have made the prescriptions. Have you started with these medications already?**
67	Patient	Ja, ja, åh ja,jeg begynte med en gang. **Yes, yes, oh yes, I began straight away**

1119/F/13-14 (Elliptical/Response to question by doctor where patient is the agent and the verb is an action verb)

In this example the patient discloses how many tablets he takes every day of the medication the doctor. The patient utterance in Line 14 fulfils both criteria and should be included: (1) "one" is an elliptical reference to "tablet" in Line 13, and (2) and provides information about the patients' actions by responding to the question in Line 13 where the patient is the agent ("du"/"you") and the verb ("tar"/"take") puts the patient in an active role.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
13	GP	Ja men da… det det står her er 1 tablett om morgenen og en klokken 13, ti[illegible] om dagen, ja. Men du… hvor mye tar du nå? **Yes but then…what it says here is 1 tablet in the morning and one at 1 pm. wo a day yes. But you… how many do you take now?**
14	Patient	En **One**

Example 1179/F/5-8 (Anaphoric reference to tool/ The patient is the agent and the verb is an action verb)

In this example the patient tells the GP that he is uses the print-out of the medication list actively; implicitly he indicates that he is using the medications on the list. The patient utterance in Line 8 fulfils both criteria and should be included: (1) "den"/"it" is an anaphoric reference to a tool to dispense medications; "utskrift over medisiner"/"print-out of medications" in Line 5, and (2)) it is about the patient's active action with the tool by referring to himself as the agent ("jeg"/"I") and the action verb ("følger"/"follow").

Note that Line 6 does not fulfil criteria since it (A) is a response to a question where the verb used in Line 5 includes a passive role for the agent ("har"/"have", and (B) the patient utterance is limited to "yes".

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
5	GP	Ja. Har du fått en utskrift over hvilke medisiner du har? **Yes. Have you received a print-out of which medications you have?**
6	Patient	Ja. **Yes.**
7	GP	Så du har den. **So you have it.**
8	Patient	Den følger jeg. **I follow it**

1213/F/62-63 (Elliptical/ The patient is the agent and the verb is an action verb)

Difficult case; Here the doctor is giving an instruction to the patient to continue taking his medications and the patient responds with a substantive reply indicating he is in accordance ("så det går bra"/"so that's ok"). Exchanging "du"/"you" with "jeg"/"I" in the instructive statement by the doctor turns the utterance into "jeg skal fortsette med de medisinene /"I shall continue taking those medications"), fulfilling both criteria and should be included: (1) it is about medications, and (2) refers to the patient as the agent ("jeg"/"I") and the verb is an action verb ("fortsette"/"continue").

Note that if the patient responds with only "mm", "yeah", "yes" it should be excluded.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
62	GP	Jeg vet at det er plagsomt, men du skal fortsette med de medisinene. **I know it is a nuisance, but you shall continue taking those medications.**
63	Patient	Ja, ja. Nei da, jeg hører hva du sier, så det er… så det går bra **Yes, yes. No well, I hear what you are saying, so that is…so that's ok.**

1179/V/63-64, Contrasting example to be excluded: (Visual description / Discuss future medication options)

In this example the patient and doctor are discussing options to the current anticoagulant therapy (injections with Fragmin syringes). Criterion 1 is fulfilled in the patient utterance as it refers to "Syringes" – prefilled syringes of Framin prescribed for self-administration at home. The patients utterance includes an anaphoric reference "det"/"that" to the medications presented in Line 63, and it is implied that he is the agent when he uses the action verb "tar"/"take". However, the anaphoric reference refers to medications not yet prescribed for use by the patient at home and therefore should not be included.

Note that in Line 63 the doctor talks about "Nå pleier vi å bruke"/"Nowadays we tend to use" the agent ("vi"/"we") refers to the doctors and their actions and therefore does not fulfil criteria.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
63	Hospital doctor	Nå pleier vi å bruke noen nyere tabletter som er litt enklere å følge opp enn Marevan, som vi kaller Eliquis eller Xarelto, eller…ja… **Nowadays we tend to use some newer tablets that are a bit easier to follow than Marevan, that we call Eliquis or Xarelto, or yes…**
64	Patient	[Jeg] Tar gjerne det istedenfor de sprøytene [Fragmin] **[I] Take rather that instead of those syringes [Fragmin]**

1179/V/33-34, Contrasting example to be excluded (Specific medications by brand and generic name/Verb places patient in a passive receptive role)

In this example the doctor is verifying the list of prescriptions, rather than asking the patient about how the patient is using it. They are clearly talking about medications as Line 33 includes references to a class of medications (diuretics) and specific medications by brand name (Furix, Forxiga, Lipitor) and generic name (Bisoprolol, Calceferol). The doctor asks the patient about this in Line 33, but uses verbs that indicates that the patient is receiving something ("står på"/"stand on") rather than is doing something with the medications. Similar verbs that indicates the patient is in a passive role or has something done to him/her is listed in table 4. Note that since the patient utterance is limited to "Ja"/"Yes" response to the doctors question it would not have fulfilled criterion 2 even if the doctor asked a question putting the patient in a more active role.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
33	Hospital doctor	For det jeg så på…Ikke sant, du stod på vanndrivende, Furix, og så stod du på Forxiga og så stod du på Bisoprolol og Calceferol og Lipitor – altså du står jo på en del medisiner **Because what I looked at…Isn't it, you stood on diuretics, Furix, and then you stood on Forxiga and then you stood on Bisoprolol and Calceferol and Lipitor – actually you stand on several medications.**
34	Patient	Ja **Yes**

1179/V/11-12, Contrasting example to be excluded (Tools and medications in general / Limited patient response)

In this example the patient utterance only includes a "yes" in his response when the doctor asks a question about use of medications. Always exclude utterances where the patient responds with only a respons limited to "yes", "mm", "no") to statements or questions by the clinician since we are interested in capturing the semantic offerings of the patient, not what the doctor assumes or already (think he/she) knows.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
11	Hospital doctor	Og den listen, det er de medisinene du bruker nå? **And that list, it is those medications you use now?**
12	Patient	Ja **Yes**

Example 1119/F/86-87 (Specific medication by brand name / The patient requests a repeat prescription)

In this example the patient accepts an offer of repeated prescriptions for three specific medications. The utterance implies that he is currently using the medication, has run out, and plans to use it in the future. The patient utterance in Line 87 fulfils criteria and should be included: (1) it includes references to specific medications by brand names ("Sobril", "Zopiclone", "Paralgin Forte"), and (2) the patients' action (intake) of medication is implied when he asks about a repeat prescription.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
86	GP	Hvordan er det med medisiner? **What's it like with medications?**
87	Patient	Jeg tenker på de tre… de jeg pleier å få hadde jeg nær sagt, den Sobrilen, spesielt Paralgin Forte, fordi beina er veldig vonde. Og så Zopiklone, akkurat de tre. **I'm thinking on those three. Those that I usually get I was about to say that Sobril, and specially Paralgin Forte, because the legs are very painful. And then Zopiclone, specifically those three.**

1149/F/179-186 Contrasting example to be excluded (Elliptical / Checking e-prescription availability)

In this example the doctor has checked status of in the national e-prescription database to verify that the hospital doctors have prescribed the new medications. In line 179 he informs the patient that there are active prescription available for the patient when he needs it. In Line 180 the patient asks for information about how many tablets and packs of medication he can withdraw with the current prescription. In this transcript the patient does not ask for a repeat prescription, he just verifies what is available to withdraw from the pharmacy. Therefore the patient utterance does not indicate use of the medication and should be excluded.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
179	GP	Da har du alle resepter du trenger ser det ut som. **Then you have all prescriptions you need by the looks of it.**
180	Patient	Ja den nye hjertemedisinen, hvor mye er den skrevet ut på? **Yes, the new heart medication, how much is the prescription for?**
181-185	GP	Tenker du på den Forxiga? …. *(removed utterences where doctor gives info about the medication)* Så den er skrevet ut slik at du kan hente ut resepten 3 ganger, og så er det 100 tabletter i pakken. **Are you thinking about Forxiga? *(removed utterences where doctor gives info about the medication) So that one is written so that you can withdraw from the prescription three times, and there are 100 tablets in the box.***

186	Patient	Ja det holder. **Yes that is enough**

1213/F/126-129 (Medications in general + brand name/ The patient asks about drug combinations)

In this example the patient asks the doctor if there are any problems about combining medications – in Line 128 he clarifies that the medication in mind is Viagra. The utterance implies he is currently using Viagra in addition to the ones discussed in the hospital. The patient utterance in Line 126 fulfils both criteria and should be included: (1) it refers to medications in general, and (2) the patients' action (intake) of medication is implied when he asks about (safe) drug-drug interactions.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
126	Patient	Så da har jeg fått svar på det meste. Jeg… eventuelt andre medikamenter, for å nå å sette det også litt på spissen, jeg har jo de ved siden av. Er det noen begrensninger der? **So then I have been given answers to most things. I…what about other medications, to put it bluntly, I have some on the side. Are there some limitations there?**
127	Hospital doctor	Hva mener du da? **What do you mean then?**
128	Patient	Nei jeg tenker på sexliv osv. Jeg er jo ikke en ung mann lenger. Ja sånn i Viagra og sånne ting. **No I think about sexlife etc. I am no longer a young man. Yes so..yes Viagra and the like.**

1155/V/64-66 (Visual description / The patient talks about manipulation of medication doses)

In this example the patient has her medications delivered in automatically dispensed bags with medications (multidose) and she provides information about the intake of the medication (dose) by describing how it was not possible to manipulate the tablet (halve it with a tablet cutter). Line 64 and 66 are coded together because the doctor does not interrupt the patient's turn. The patient utterances in Line 64 and 66 fulfils both criteria and should be included: (1) It is about medication because "the blue one" is a visual description of Digoxin tablets prescribed (verified by medical records and search in database with visual descriptions of medications), and (2) the patients' action (intake) of medication is implied when she goes into details with how the administration had to be manipulated to get the correct dose (taking every other day because halving was impossible).

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
64	Patient	Ja den blå får jeg annenhver dag **Yes, the blue I get every other day**

65	Hospital doctor	Den blå **The blue one**
66	Patient	Fordi at jeg skulle egentlig ha en halv hver dag, men det nytter ikke å kutte den opp sånn som med andre tabletter **Because I should really have taken one half every day, but it is impossible to cut it as one does with other tablets**

1056/F/34-37 (Elliptical / The patient asks if a dose can be adjusted)

In this example the patient asks if it is possible to reduce the dose of Forxiga. The utterance implies that he is currently using the medication, since he engages in discussions about adjusting the dose based on the doctor's concern (Line 34+36). The patient utterance in line 37 fulfils both criteria and should be included: (1) "En halve en"/"one half" is interpreted as an elliptical reference to the medication brand name Forxiga in Line 34, and (2) The patients' action (intake) of medication is implied when he asks about an adjustment of the dose.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
34	GP	Og så har du egentlig litt vanndrivende effekt også i en sånn medisin som heter Forxiga som er en slags sukkersykemedisin. Men den gjør at du også drar med deg…med litt sukker så drar den med seg litt ekstra vann ut av kroppen også. Så den har man begynt å bruke på hjertesvikt også **And then you also have a small diuretic effect too in one medication called Forxiga that is a type of diabetes medication. But it also does it so that you draw out..with some sugar too that takes with it some extra water out of the body too. So one has started to use it for heart failure too.**
35	Patient	Å ja **Oh yes**
36	GP	Nå er ikke du så veldig stor kar og du har gått ned mye i vekt fra før, så det er litt sånn…litt bekymret for at du skal tape litt mye energi også. **You are not such a big lad and you have lost a lot of weight previously, so it is a bit like…abit concerned that you will loose a little too much energy as well.**
37	Patient	Kan jeg ikke få en halv en da? Eller… **Can't I get one half then? Or…**

1213/F/15 (Some medications by indication / The patient asks if he can stop taking a medication)

In this example the patient asks GP if he can stop taking the cholesterol lowering medication – he is negotiating if these can be deprescribed. This can suggest that he is taking them but would prefer to stop. The patient utterance in Line 15 fulfils both criteria and should be included: (1) "Kolesterolpillene"/"Cholesterol pills" is a colloquial term for cholesterol lowering medication, and (2) The patients' action (current intake) of medication is implied when he asks it can be deprescribed.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
15	Patient	Ja. Så da kan jeg kutte kolesterolpillene? **Yes. So then I can stop taking these cholesterol pills?**

1149/F/61-62 (Medications in general / The patient questions change to current prescriptions)

In this example the patient asks the GP if it is possible for leave the medications unchanged for a period, so that they can become stabilised. The patient is negotiating against the doctors' suggestion to reduce one of the medications to curb patient reported side-effects of dizziness. This response suggests that the patient is using the prescribed dose of the medication in question (bloodpressure tablet) but prefers to remain on this dose and also leave the others unchanged even if there are side-effects. The patient utterance in Line 62 fulfils both criteria and should be included: (1) "medisinene"/"medications" refers to her medications in general, and (2)patient's action with the medication (current intake as prescribed) is implied by negotiating that the dose should not be reduced as she prefers things to remain stable (This worry is repeated throughout the medical encounter)

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
61	GP	Men det er ikke noe i veien for å prøve å gå ned til 2 ½ [blodtrykksmedisin] på kvelden da, å gå tilbake til det du hadde, og så tar vi heller ta en kontroll om en uke eller to. **But there is nothing in the way to try to reduce down to 2 ½ [blood pressure tablets] in the evening, to go back to what you had previously, and then we rather make another checkup in a week or two.**
62	Patient	Men kan jeg ikke stå stabilt nå en… sånn at medisinene liksom får stabilisert seg. **But can I not stand stabilised now on...so that the medications can become stabilised?**

1037/F/39-41 (Tool + colloquial term / The patient questions change to current prescriptions)

In this example the patient asks the GP to verify that he has understood correctly that the prescription strength iron tablets have been deprescribed (seponert) by the hospital doctors as he no longer finds it on the medications list from the hospital. The question implies that the patient has been using the medication and wants to be sure he is adhering to new changes. The patient utterances in Line 39 and 41 are coded together as one speech turn since it is only interrupted by a "Ja"/"Yes" from the doctor that indicates that he would like the patient to continue with his turn. Line 39 and 41 fulfils both criteria and should be included: (1) "medisinlista mi"/"my medication list" and "jerntablettene"/"irontablets" both refer to medications , and (2) the patient has a need to verify with his GP that he has understood correctly the recent changes done to his medication list by the hospital doctors, thereby indicating an uncertainty/worry regarding current actions with this medication at home.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
39	Patient	Jeg ser på medisinlista mi at jerntablettene er ute **I notice on my medication list that the iron tablets are out**
40	GP	Ja **Yes**
41	Patient	Skal det [jerntablettene] …er det[jerntablettene] seponeres det kalles eller noe sånt? **Should it [iron tablets]..is it [iron tablets] deprescribed it is called or something like that?**

1228/V/97-100 (Elliptic + Generic name of medication / The patient challenges a statement/question by the clinician that assumes the patient is using a medication)

In this example the doctor informs the patient about which medications he is using (cholesterol lowering and metformin). However, the patient seems to disagree with the doctor's assumption, and challenges the doctor's statement twice, first in Line 98 and then in Line 100. These two questions by the patient indicate that the patient, contrary to the doctor's belief, is NOT taking these two medications, thereby implicitly providing information about his actions with the medication. This transcript includes two MADICI (Line 98 and Line 100). Line 98 fulfils both criteria and should be included by (1) Elliptical reference to medication mentioned in Line 97, and (2) The patient's action with the medication (currently not taking) is implied by challenging doctors' assumptive statement about what he is taking. Line 100 fulfils both criteria by (1) Generic name of diabetes medication ("metformin"), and (2) Patient's action with medication (currently not taking) is implied by the exclaiming a surprise ("Å"/"Oh") followed by questioning the doctors statement and pointing to his prefilled medication box.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
97	Hospital doctor	Og så har du fortsatt sånn kolesterolsenkende. **And then you still have those cholesterol lowering medications.**
98	Patient	Er du sikker? **Are you sure?**
99	Hospital doctor	Ja. Og du bruker fortsatt Metformin mot diabetes. **Yes. And then you still use Metformin against diabetes.**
100	Patient	Åh? Som ligger her mener du [peker på fylt dosett boks som han har med seg]? **Oh? That are laying here you mean [points to a prefilled 7 day dosett box that he has brough in to hospital]?**

1037/U/72 (Specific medication by brand name / The patient asks for a second opinion or rationale for using a medication currently in use)

In this example the patient asks a question to the hospital doctor to verify the indication and benefit of using Sodium bicarbonate powder (Natron) for kindney problems. The question implies that he is using Natron at home. The patient utterance fulfils both criteria and should be included: (1) Brand name for medication ("Natron"), and (2) Patient's action (intake) is implied by asking for a second opinion to verify the benefit of using the medication ("…det er bra for nyrefunksjonen – kan det stemme"/"…it is good for the kidney function. Is that correct?").

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
72	Patient	Jeg har forstått at Natron, det der pulveret som jeg blander ut, at det er bra for nyrefunksjonen. Kan det stemme? **I have understood that Natron, that powder that I mix into water, that it is good for the kidney fuction. Is that correct?**

1040/F/469-474, Contrasting example to exclude (Specific medication by brand name /The patient asks for a second opinion on behalf of another doctor)

In this example the patient is passing along a request to the GP from the hospital doctor to revise a painkiller (Dolcontin). The hospital doctor expressed a concern about the use of Dolcontin to the patient during the discharge visit, informed the patient that it was not ideal to use it regularly, and asked the patient to bring it up with the GP for review. In this case the patient does not take any "ownership" to the request by making the hospital doctor the agent in his utterance ("hu lurte"/"she wondered"), and thereby just functions as a messenger for the hospital doctor. Not MADICI.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
469-470	Patient	Men den Dolcontinen. Legen der borte på SHUS va'kke så veldig glad i den. **But that Dolcontin. The doctor over there at Ahus was not so very happy about that one**
471	GP	Nei **No**
472-474	Patient	Så hu lurte på om det ikke var mulig å få en annen, som hadde omtrent samma virkningen. **So she wondered if it was not possible to get another,** **That had approximately the same effect.**

Patients' experiences

1036/F/27-30 Patient (Elliptical reference to medication/ Patient reports a positive or negative symptom, effect, or side-effect)

In this example the doctor and patient are discussing prescription changes over the past period. During the first 3 turns (Line 27-29) the patient and doctor are exchanging information about prescription decisions taken by the doctors ("de"/"they" in Line 27 and 28). In these first turns the patient is not the agent and when referred to the patient is in a passive receptive role. In Line 30 the patient makes a comment that builds on the previous information exchange – he refers to a change in symptoms that by implication reveal the patient's intake of Burinex. Line 30 fulfills both criteria and should be included: (1) It is an elliptical reference to medications mentioned by brand name in Line 27 and anaphoric references in Line 28 and 29 ("1/2 tablett"/"1 mg"), and (2) patient's experience with medication is revealed by reporting a positive effect of taking the medication on his symptoms of oedema in this legs ("Så jeg er mindre hoven i beina nå"/"So I am less swollen in by legs now").

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
27	GP	og så har de økt Burinexen, den vanndrivende. For den har jo vi sjonglert litt med her. Vi har sagt til deg at… **and then they have increased the Burinex, the diuretic. Because that one we have juggled abit with here. We have told you that…**
28	Patient	Du begynte med ½ tablett, og så kom jeg til SYKEHUS, og så økte de til en. **You started with ½ tablet, and then I came to the hospital, and then they increased to one.**
29	GP	Til 1 mg ja. **To 1 mg yes.**
30	Patient	Så jeg er mindre hoven i beina nå altså, det er jeg. **So I am less swollen in my legs now, that I am.**

1179/V/5-6 (Class of medication by indication / Patient reports a positive or negative symptom, effect, or side-effect)

This is another example, similar to 1036/F/27-30 (page 38). Again the patient is not explicitly saying he has taken medication, but by reporting a positive effect on symptoms (loosing weight) together a reference to "regulate with diuretics" (ambiguous action verb; interpreted to point to altering doses), he indicates the experience is caused by intake of diuretics. Line 6 fulfils both criteria and should be included: (1) Class of medication ("diuretika"/"diuretics") used to reference medication, and (2) Patient reports an experience with medication ("iløpet av en uke så var jeg nede på ca. 80"/"within a week I was back down at approximately 80"), thereby indicating using medications at home.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
5	Hospital doctor	Hadde du brystsmerter da? **Did you have any chest pain then?**
6	Patient	Lite grann var det vel. Hvis jeg lå liksom på den siden og sånn, men det var ikke det som var greia. Jeg gikk på vekta, og så plutselig hadde jeg gått opp en 3-4 kilo. Og i løpet av noen kommende dager så hadde jeg plutselig gått opp til 87 kg istedenfor 80 som jeg pleier å veie. Og så var jeg hos fastlegen og fikk noe vanndrivende og litt sånn, og så liksom begynte det å rulle litt da. Så i løpet av en uke igjen så var jeg nede på ca. 80. Så jeg prøver å regulere litt med disse vanndrivende da. **A little bit I believe. If I was lying on that side, but that was not the issue. I went on the scales, and then suddenly I had gained 3-4 kilograms. And over a few days I had suddenly reached 87 kg instead of 80 that I usually weigh.And then I was at the GP and got some diuretics and the like. And then it kinda started rolling a bit. So within a week I was back down at approximately 80. So, I try to regulate a bit with these diuretics.**

1004/V/10 (Mispronounced names / Patient reports a negative effect)

This transcript exemplifies how patient's may struggle to recollect and use the correct name for medications. This patient has been prescribed Burinex, but during the consultation he refers to it as Burinetti (some other variation too). The patient utterance in Line 10 fulfils both criteria and should be included: (1) It is about medication because "Burinetti" is recognised as "Burinex" prescribed in his medical records and interpreted as a mispronunciation of the medication name, and (2) Patient reports his negative experience with this medication ("det første jeg gjorde var jo å pisse på meg"/" the first thing I did was to pee on myself"). As the medication is still prescribed it is a relevant experience.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
10	Patient	Ja han fastlegen min han anbefalte en sånn Burinetti da. Så begynte jeg å ta den da vet du, og den er jo sånn… Så det første jeg gjorde var jo å pisse på meg … **Yes my general practitioner he recommended a Burinetti then.** **So I began to take it you know, and it is just like… So the first thing I did was to piss myself…**

1218/V/105-112 (Tool / Patient discloses a positive or negative experience with using tool for organising medications at home)

In this example the doctor asks about the patient's system for organising intake of medications at home. He explicitly asks whether the patient uses multidose. The patients shares his experience with multidose (automatically dispensed, pre-filled bags with dose of medication) and thereby indicates taking medications at home as prescribed. Patient utterances in Line 108, 110 and 112 are coded together (=one speech turn) since the doctor does not interrupt the patient's turn, instead he only says "yes" and "no" to encourage the patient to continue talking. The patient utterances fulfil both criteria and should be included: (1) "Multidose" is a tool used to organise medications, and (2) patient's experience with using the tool indicates his use of medications at home.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
105	Hospital doctor	Hvordan har det fungert hjemme i det daglige da? Har du fått sånn multidose med tanke på medisiner og sånn? **How has it worked at home everyday? Have you received multidose with regard to medications and the like?**
106	Patient	Ja **Yes**
107	Hospital doctor	Hjelper det å holde orden på ting? **Does it help to keep things organised?**
108	Patient	Det gjorde det til å begynne med. **It did in the beginning.**
109	Hospital doctor	Ja **Yes**
110	Patient	Men ikke nå tror jeg. **But not anymore I think.**
111	Hospital doctor	Nei **No**
112	Patient	Det går for trådt. Hvis en skal forandre på noe der så tar det jo 14 dager. **It goes too slowly. If one is to change something there, then it takes 14 days.**

1119/F/89 Contrasting example to be excluded (Patient reporting symptoms, effect, or side-effect unrelated to medications)

This example is a contrasting to example to 1179/V/5-6 (page 39). Here the patient mentions a symptom during history taking, but the experience of symptom changes does not include a reference to medications (criterion 1) and should be excluded.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
89	Patient	Beina har blitt mye vondere etter jeg gikk ned i vekt av en eller annen grunn. **The legs have become much more painful after I lost weight by one or another reason**

1085/F/30-31 Contrasting example to be excluded (Patient reporting symptoms, effect, or side-effect unrelated to medications)

Another example of patient's reporting an experience of symptoms. However, the patient utterance does not fulfil criterion 1 and should be excluded.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
30	GP	Mm. Du har ikke fått noen hevelse i beina eller tung pust eller… **Mm. You have not had any oedema in your legs or heavy breathing or…**
31	Patient	Jeg har lite grann rundt anklene, men ellers så er det selvfølgelig leggene og det er helt fint. **I have a little bit around my ankles, but otherwise it is the calves, and that is fine**

Patients' stance

1040/F/547-549 (Medications in general / Patient's positive stance or point of view)

Patient replies with a positive stance to his current list of medications (the volume of medications has been discussed during the interaction). Line 549 fulfils both criteria and should be included: (1) Anaphoric reference to medications ("det" /"it") refers to "medisinene"/"medications" in Line 547-548, and (2) the patient expresses a positive stance based on his experience with taking these medications ("jeg synes det er veldig greit"/"I think it is very ok"), thereby indicating use at home.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
547–548	GP	Men tenker du nå, at det er greit med de medisinene du har nå? **But do you think now, that it is ok with the medications you have now?**
549	Patient	Ja jeg synes det er veldig greit jeg. **Yes, I think it is very ok I.**

1040/F/115 Special case to include: Next of kin speaks on behalf of patient (Some medications /Patient's positive or negative stance)

In this example it is the patient's wife who speaks up on behalf of the patient. Listening to the audio-recording, the way she poses her utterance, the prosody indicates a surprise, disbelief of the need to prescribe so many medications for the same indication (heart failure). She expresses a negative point of view to the changes in her husband's medication list, pointing to the growing volume of medications in general. Utterances by patient's accompanying person to consultations may be included when they speak on behalf of the patient. In this utterance it is clear the patient is the agent by the use of pronouns ("han" / "he") and it fulfils both criteria and should be included: (1) It is about some medications ("tabletter"/"tablets"), and (2) it provides a negative view on the changes to the patient's medications, thereby indicating use of medications at home.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
115	Next of kin	Han blir satt på nye tabletter uten at noe blir tatt bort. Altså fire forskjellige tabletter mot hjertesvikt (!?) **He is started on new tablets without any being removed. Actually, four different medications against heart failure (!?)**

1004/F/119-120 (Anaphoric reference to experience of using medications / Patient's action and negative stance)

In this transcript Line 122 contains two variations of anaphoric references to medications (Criterion 1) connected to two different Criterion 2 (Patient's action and patient's stance). First, we will describe how to recognise the utterance including information about patient's action, then we will describe how to recognise patient's utterance about stance.

The patient utterance in Line 122 fulfils both criteria for patient's action and should be included: (1) The utterance is about medication because "dem"/"they" refer back to "de vanndrivende"/"those diuretics" mentioned by the clinician in Line 119, and the anaphoric reference "de"/"them" in Line 121, and (2) The utterance is about the patient's action (intake) because the patient refers to himself as the agent ("jeg"/"I") and uses and action verb ("fortsetter å ta"/"continue to take").

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
119	GP	Ok. Men da er det i hvert fall sånn: Nå har du begynt å ta de vanndrivende fast igjen. **OK. But then it is at least like this: Now you have begun to take those diuretics regularly again.**
120	Patient	Ja **Yes**
121	GP	Og det er jo sånn som jeg har sagt før at det er viktig at du fortsetter å ta de. **And then it is like that which I have said before that it is important that you continue to take them.**
122	Patient	Ja, ja, jeg fortsetter å ta dem. Men jeg liker det ikke. **Yes, yes, I continue to take them. But I do not like it.**

The patient utterance in Line 122 also fulfils both criteria for patient's stance and should be included: (1) It is about medication because "de"/"them" refer to the experience of taking "de vanndrivende"/"those diuretics" initially mentioned by the clinician in Line 119, and (2) The utterance "jeg liker det ikke"/"I do not like it" expresses that the patient is not happy about taking them.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
119	GP	Ok. Men da er det i hvert fall sånn: Nå har du begynt å ta de vanndrivende fast igjen. **OK. But then it is at least like this: Now you have begun to take those diuretics regularly again.**
120	Patient	Ja **Yes**

121	GP	Og det er jo sånn som jeg har sagt før at det er viktig at du fortsetter å ta de. **And then it is like that which I have said before that it is important that you continue to take them.**
122	Patient	Ja, ja, jeg fortsetter å ta dem. Men jeg liker det ikke. **Yes, yes, I continue to take them. But I do not like it.**

1213/F/17 (Medications in general / Patient's positive or negative stance)

In this example the patient is expressing a negative point of view to the volume of medications that he has to take. This indicates his use of medications but also his perception of overmedication. Line 17 fulfils both criteria and should be included: (1) Colloquial term for medications ("piller"/"pills"), and (2) The patient's negative stance regarding use of his medications ("Jeg har alt for mye piller" / "I have too many pills").

Note that the first utterance "Jeg spiser piller"/"I eat pills" also fulfils Criterion 1 ("piller"/"pills") and Criterion 2 (patient is the agent and the verb is an action verb: "Jeg spiser"/"I eat").

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
17	Patient	Jeg synes jeg spiser piller i eninga nå. **Jeg har alt for mye piller.** **I think I eat pills all the time now. I have too many pills.**

1033/V/120-121 Contrasting example to exclude (Patient's positive or negative stance unrelated to medications)

In this example the doctor is informing the patient about medications initiated in the hospital that may be continued when the patient is discharged. The patient expresses a positive stance in Line 121 to the prospect of continuing with this medication at home. However, Line 121 does not fulfil criterion 1 as the medication has not yet been prescribed for use by the patient (also verified against medical records) and should be excluded.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
120	Hospital doctor	Men det kan være at du må bruke vanndrivende når du skrives ut også. Det vurderer vi litt underveis. **But it may be that you will need to use diuretics when you are discharged too. That we will consider along the stay.**
121	Patient	Ja, men det er nå ikke noe problem det altså. **Yes, but that is no problem at all.**

1040/F/641-643 (Tools to organise medications / Positive or negative stance about systems for organising medication at home)

This is similar to the previous examples, but here the patient shares a positive stance to using the dosett box to dispense his medications at home. Line 641 and 643 are coded together as one analytic unit, since the doctor does not interrupt the patient's speech turn. The patient utterance fulfils both criteria and should be included: (1) It is about a tool to organise medications ("dosett"/"dosett box"), and (2) the patient provides information about his positive view to using this system to organise daily intake of medications.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
641	Patient	Jeg har dosetten min **I have my dosett box**
642	GP	Ja **Yes**
643	Patient	Da veit jeg hva jeg driver med **Then I know what I am doing**

1040/F/670 (Tools to organise medications / Positive or negative stance about systems for organising medication at home)

Here the patient discloses that he does not trust that the content of medications in automatically dispensed, prefilled bags with medications will be dispensed correctly. The patient utterance fulfils both criteria and should be included: (1) "Multidose" is a tool for organising prescribed medications, and (2) The patient expresses a negative stance to using this system for organising intake of medications.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
670	Patient	Multidose er ikke dermed sagt at det er riktig dose. **Multidose does not necessarily mean that it is the correct dose.**

Unprompted MADICI

1056/F/46-47 Example of unprompted MADICI (New topic spontaneously "out of the blue")

In the following example the doctor is talking about Entresto, a newly started medication used to control blood pressure. In the next turn, identified as a MADICI, the patient does not follow-up with a response to the doctor's statement/implicit question about using Entresto, but brings up "these diuretic pills" and asks about how long they work in the body. This is a new topic because it is about another medication than previously discussed, and the doctor has not asked for this information from the patient. Code as "unprompted"=1.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
46	GP	Så har du fått en annen hjertesviktmedisin som heter Entresto, men den h[illegible]u… ja den begynte du med også nå. **Then you have received another heart failure medication called Entresto [illegible] then you have…yes that one you also started on now.**
47	Patient	Ja…Men disse vanndrivende pillene, når jeg tar dem om morgenen fra klokka 9 eller jeg kan jo stå opp 7 også for å ta dem. Hvor lenge virker de på dagen liksom? Jeg har følelsen at de virker i hvert fall 4 til 5 timer. Er det riktig? **Yes…but these diuretic pills, when I take them in the morning from 9 o'clock or I can also get up at 7 also to take them. How long do they work during the day? I have a feeling that they work at least for 4 to 5 hours. Is that correct?**

1004/V/111-114 Example of unprompted MADICI (Steers conversation in a new direction)

In the following example the doctor is doing a medication reconciliation and presents information to the patient in Line 111 about which medications he has recently withdrawn from the pharmacy to aid the process. In the next turn, Line 112, the patient answers briefly and non-engaged, so the doctor rephrases his question in Line 113 asking specifically if the patient is using "it" (=anaphoric reference to Duodart in Line 111). In Line 114, identified as a MADICI, the patient answers the doctor on his specific question in Line 114 (stays on topic about which medications he is using) but then mid-utterance, steers the conversation to another medication, disclosing that he has discontinued it. ("That Burinetti I have stopped taking"). Code as "unprompted" =1.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
111	Hospital doctor	Og så ser jeg du har hentet ut [fra apoteket] en som heter Duodart, som [...] for vannlating. **And then I see that you have just collected one [from the pharmacy] called Duodart.**
112	Patient	Ja vel **Yes ok**
113	Hospital doctor	Stemmer det at du har den? **Is it correct that you are using it?**
114	Patient	Nei jeg tar ikke den. Jeg tar…jeg tok den der Burinetti altså. Og så er det [...]a det er en til for vannlatingsom jeg tar. Men den tar jeg på kvelden den også. Den Burinetti [...]argitt meg med. **No, I don't take that. I take… I took that Burinetti [mispronounced brand name for bumetanide]. And then it is…yes there is another one for diuresis that I take. But that one I take in the evening too. That Burinetti I have stopped taking.**

1119/F/7-8 Example of a prompted MADICI (Logical and relevant response)

In the following example the doctor reads up on the patient's recent hospital admission and makes a comment regarding recent medication changes. The patient utterance, identified as a MADICI, is a logical and relevant response on the same topic. Code as "prompted" =0.

LINE	SPEAKER	TRANSCRIPT OF AUDIORECORDED CONSULTATION
7	GP	You were heavy breathing and…let's see, only to see the conclusion of… from the discharge letter...[GP reads on the computer monitor] Yes, you received a couple of new medications.
8	Patient	Yes [Laughs] I have plenty of medications.

Litterature

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S2 Overview of 62 redflag-topic descriptions, sorted by commonalities and association with intentional/non-intentional non-adherence risk

Topic ID	Patient ID	Description of patient's problem disclosure(s)	Topic of adherence problem disclosure	Sorted using PAPA Framework[10], by:	
				Type of patient-oriented adherence barrier	Intentional or un-intentional adherence risk
t1	1033	Patient worried about deviations from prescribed dosing times	Concerns or worries about medications	Perceptual factor (e.g., beliefs and motivation)	Int
t2	1085	Patient reports medication limiting daily activities	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t3	1085	Patient reports adverse effects of medication started for the first time	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t4	1085	Patient reports struggeling to keep own medication list updated and worries about taking medication incorrectly as a consequence	Limited ability to organise intake of medications in use	Practical factor (e.g., ability and resources)	Un-Int
t5	1007	Patient is worried about having (too) many medications	Concerns or worries about medications	Perceptual factor (e.g., beliefs and motivation)	Int
t6	1004	Patient reports intentionally discontinuing one specific medication due to adverse effects limiting quality of life	Negative stance to medications	Perceptual factor (e.g., beliefs and motivation)	Int
t7	1004	Patient is unable to report medication intake in accordance with prescribed regimen	Limited ability to recall or recognise medications in use	Practical factor (e.g., ability and resources)	Un-Int
t8	1004	Patient reports lack of effect of medication	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t9	1004	Patient report indicates inappropriate use of sleeping tablets	Negative stance to medications	Perceptual factor (e.g., beliefs and motivation)	Int
t10	1036	Patient indicates reluctance to take medication at recommended time	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t11	1037	Patient struggles to keep overview of prescribed medications	Limited ability to organise intake of medications in use	Practical factor (e.g., ability and resources)	Un-Int
t12	1040	Patient reports side-effects of medication started for the first time	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t13	1040	Patient worried about having (too) many medications, wether they are safe to combine and expresses wish to reduce	Concerns or worries about medications	Perceptual factor (e.g., beliefs and motivation)	Int
t14	1040	Patient expresses a negative stance to Multidose	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int

Topic ID	Patient ID	Description of patient's problem disclosure(s)	Topic of adherence problem disclosure	Sorted using PAPA Framework[10], by:	
				Type of patient-oriented adherence barrier	Intentional or un-intentional adherence risk
t15	1056	Patient experiences adverse effects after medication changes	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t16	1119	Patient expresses negative stance to new dosing schedule and later discloses omitting doses	Negative stance to medications	Perceptual factor (e.g., beliefs and motivation)	Int
t17	1119	Pt is worried about using medication	Concerns or worries about medications	Perceptual factor (e.g., beliefs and motivation)	Int
t18	1119	Patient reports having (too) many medications	Concerns or worries about medications	Perceptual factor (e.g., beliefs and motivation)	Int
t19	1127	Patient is unable to report medications in use during medication reconciliation, hospital has misplaced medication list given by patient to ambulance personnel	Limited ability to recall or recognise medications in use	Practical factor (e.g., ability and resources)	Un-Int
t20	1127	Patient reports recent episodes of hypoglycaemia due to illness and intake of insulin	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t21	1127	Patient experiences adverse effects	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t22	1127	Patient worried she has used wrong dose due to different info in discharge letter and pharmacy label	Health care systems related barrier	Practical factor (e.g., ability and resources)	Un-Int
t23	1139	Patient worried about using medication due to side-effects	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t24	1139	Patient does not understand need for medication and experiences side-effects of medication	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t25	1139	Patient expresses reluctance to use medication after experiencing and reading about side-effects	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t26	1139	Patient did not use medication in hospital due to forgetting to tell them about it	Limited ability to recall or recognise medications in use	Practical factor (e.g., ability and resources)	Un-Int
t27	1149	Patient experiences adverse effects but is also worried about medication changes	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t28	1149	Patient reports being unable to fill prescription	Health care systems related barrier	Practical factor (e.g., ability and resources)	Un-Int
t29	1155	Patient unable to name medications in use	Limited ability to recall or recognise medications in use	Practical factor (e.g., ability and resources)	Un-Int

Topic ID	Patient ID	Description of patient's problem disclosure(s)	Topic of adherence problem disclosure	Sorted using PAPA Framework[10], by:	
				Type of patient-oriented adherence barrier	Intentional or un-intentional adherence risk
t30	1155	Patient stopped medications due to adverse effects	Negative stance to medications	Perceptual factor (e.g., beliefs and motivation)	Int
t31	1176	Patient is unable to name medications in use	Limited ability to recall or recognise medications in use	Practical factor (e.g., ability and resources)	Un-Int
t32	1176	Patient discloses having discontinued medication	Negative stance to medications	Perceptual factor (e.g., beliefs and motivation)	Int
t33	1176	Patient unsure why she needs medication	Concerns or worries about medications	Perceptual factor (e.g., beliefs and motivation)	Int
t34	1179	Patient unable to name medications in use and struggles to report medication changes	Limited ability to recall or recognise medications in use	Practical factor (e.g., ability and resources)	Un-Int
t35	1179	Patient experiences adverse effects	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t36	1179	Patient reluctant to use medication for injection	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t37	1187	Patient has omitted morning doses	Limited ability to organise intake of medications in use	Practical factor (e.g., ability and resources)	Un-Int
t38	1187	Patient reports he does not recognise the medication doctor is talking about	Limited ability to recall or recognise medications in use	Practical factor (e.g., ability and resources)	Un-Int
t39	1193	Patient expresses negative stance to dispensing medications several times during the day	Limited ability to organise intake of medications in use	Practical factor (e.g., ability and resources)	Un-Int
t40	1193	Patient expresses resistance to use optimal dose of medications	Negative stance to medications	Perceptual factor (e.g., beliefs and motivation)	Int
t41	1193	Patient worried about running out of new medications at home	Health care systems related barrier	Practical factor (e.g., ability and resources)	Un-Int
t42	1193	Patient discloses potentially inappropriate use of medication	Negative stance to medications	Perceptual factor (e.g., beliefs and motivation)	Int
t43	1212	Patient reports being unable to dispense own medications	Limited ability to organise intake of medications in use	Practical factor (e.g., ability and resources)	Un-Int
t44	1213	Patient worried about combining new medications with medications for erectile dysfunction	Concerns or worries about medications	Perceptual factor (e.g., beliefs and motivation)	Int
t45	1213	Patient reports symptoms he thinks are adverse effects and wants to reduce medications he believes are unnecessary	Negative stance to medications	Perceptual factor (e.g., beliefs and motivation)	Int
t46	1218	Patient reports not being able to use medication due to adverse effects	Negative stance to medications	Perceptual factor (e.g., beliefs and motivation)	Int

Topic ID	Patient ID	Description of patient's problem disclosure(s)	Topic of adherence problem disclosure	Sorted using PAPA Framework[10], by:	
				Type of patient-oriented adherence barrier	Intentional or un-intentional adherence risk
t47	1218	Patient unable to keep overview and dispense own medications	Limited ability to organise intake of medications in use	Practical factor (e.g., ability and resources)	Un-Int
t48	1218	Patient reports symptoms perceived as adverse effects of medications	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t49	1228	Patient does not think he uses medications the doctor says he is using, but also struggles to recall names of medications	Limited ability to recall or recognise medications in use	Practical factor (e.g., ability and resources)	Un-Int
t50	1228	Patient forgets to take medications	Limited ability to organise intake of medications in use	Practical factor (e.g., ability and resources)	Un-Int
t51	1231	Patient unable to recall names of medications in use	Limited ability to recall or recognise medications in use	Practical factor (e.g., ability and resources)	Un-Int
t52	1231	Patient is unsure if he has the most effective medication since he does not notice any improvement	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t53	1231	Patient reports adverse effects	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t54	1241	Patient reports irregular intake of medications pre-hospital admission	Limited ability to organise intake of medications in use	Practical factor (e.g., ability and resources)	Un-Int
t55	1241	Patient reports being uncertain about necessity of medication changes	Concerns or worries about medications	Perceptual factor (e.g., beliefs and motivation)	Int
t56	1241	Patient experiences adverse effects after starting with new medications	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t57	1241	Patient reports potential lack of effect of medication	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t58	1244	Patient unable to recall names of medications in use	Limited ability to recall or recognise medications in use	Practical factor (e.g., ability and resources)	Un-Int
t59	1244	Patient reports symptoms perceived as adverse effects of medication of new medications	Negative experience with medications	Perceptual factor (e.g., beliefs and motivation)	Int
t60	1244	Patient worried she has used wrong dose due to different info in discharge letter and pharmacy label	Health care systems related barrier	Practical factor (e.g., ability and resources)	Un-Int
t61	1317	Patient has discontinued medication	Negative stance to medications	Perceptual factor (e.g., beliefs and motivation)	Int

Topic ID	Patient ID	Description of patient's problem disclosure(s)	Topic of adherence problem disclosure	Sorted using PAPA Framework[10], by:	
				Type of patient-oriented adherence barrier	Intentional or un-intentional adherence risk
t62	1317	Patient does not think he uses the medication the doctor is referring to regarding a dose change	Limited ability to recall or recognise medications in use	Practical factor (e.g., ability and resources)	Un-Int

S3 NO/ENG Translation of illustrative example of addressed redflag-topic

Redflag-topic 50: Patient forgets to take medications. Indicated adherence barrier: Limited ability to organise intake of medications in use (Practical problem, risk of unintentional non-adherence)			**Coding notes**
Line	**Speaker**	**FIRST FOLLOW-UP WITH GP**	
t50-F-1	Doctor (GP)	Føler du at det går greit å styre medisinene selv da? **Do you feel it goes well to manage your own medications?**	
t50-F-2	Patient	Ja.... Ja jeg synes det altså. Jeg kunne jo tatt med medisinesken hit nå og vist deg hvordan jeg har lagt inn det, men… er det 5… 6 medisiner jeg bruker. Altså en ting jeg er veldig dårlig på det er å huske navnene på de medisinene. Så det sier meg ingen ting. **Yes…yes I believe so. I could have brought with me the dosette box here now to show you how I have put them in, but it is 5…6 medications that I use. Well, one thing that I am very bad at is to remember the names of those medications. So that tells me nothing.**	
t50-F-3	Doctor (GP)	Nei og det er ikke så lett vet du fordi at dessverre så er det jo sånn at det kan stå et navn på medisinen og så får du noe… så er det virkestoffet som de gir ut på apoteket og så blir det… **No, and it is not so easy because unfortunately it is so that it can be written one name on the medication and then you get something…then it is the generic name that they hand out from the pharmacy and then it gets…**	
t50-F-4	Patient	Ja, ja, så… men da leser jeg på etiketten, og så legger jeg ut hvis det er morgen og kveld da, så legger jeg ut direkte og så tar jeg neste boks. Men så må jeg innrømme at det hender jeg glemmer å ta de. **Yes, yes, so…but then I read on the label, and then I lay out if it is morning and evening, so I put them out directly and then I take the next box. But then I have to admit that it happens that I forget to take them.**	(Patient's first disclosure about this specific adherence problem in the consultation)
t50-F-5	Doctor (GP)	Medisinene? **Medications?**	
t50-F-6	Patient	Ja. Og det kan være både morgen og kveld. **Yes. And it can be both morning and evening.**	
t50-F-7	Doctor (GP)	Men hvor ofte skjer det da? **But how often does that happen?**	Doctor seeks additional information about patients' adherence behaviour and scope of the problem
t50-F-8	Patient	Det er nok en gang i uka jeg har en eller annen sånn,... at jeg "å fankern nå glemte jeg den i går". **It is probably once a week I have one or another like … that I go "damn, now I forgot it yesterday"**	

t50-F-9	Doctor (GP)	For det er jo det som eventuelt skulle være grunnen til at vi skulle sette hjemmesykepleien til å liksom følge opp det litt mer, hvis du glemmer det for ofte da. Klart, en sjelden gang er det ikke noe krise, men hvis det er liksom gjennomgående at det skjer… Men kunne du ha hatt en alarm på klokka di da som peip? **Because that is what potentially could be the reason why we should get home care nurses to perhaps follow that up a bit more, if you forget it too often. Of course, once in a while is no crisis, but if it is a regular occurrence that it happens…. But could you have an alarm on your watch that made a "pip-sound"?**	Doctor provides adherence support: Suggests (1) ordering professional services to take responsibility for management of medications, and (2) using alarms to alert medication intake
t50-F-10	Patient	Det har jeg fått da. **I have been given that.**	
t50-F-11	Doctor (GP)	Men som også som piper til faste tider når du skal ta medisinen din. **But one that gives a sound at regular times when you should take your medication.**	Doctor continues to suggest using alarms
t50-F-12	Patient	Ja…[høres tankefull ut] Yes…[sounds pensive]	
t50-F-13	Doctor (GP)	Det går an å legge inn sånne faste alarmer da, hvis det kunne vært enklere. **It is possible to enter regular alarms if that could be easier.**	Doctor continues to suggest using alarms
t50-F-14	Patient	Ja…ja..[høres tankefull ut] **Yes.. yes…**[sounds pensive]	
t50-F-15	Doctor (GP)	Eller at du har en rutine på at du tar de i forbindelse med tannpussen for eksempel, ikke sant? **Or that you have a routine that you take them when you brush your teeth for example, right?**	Doctor provides adherence support (3) suggests using daily routines to support adherence.
t50-F-16	Patient	Ja, det er morgen og kveld. **Yes, that is morning and evening**	
t50-F-17	Doctor (GP)	Mm. Det er det å huske det. **Mm. It is about remembering it.**	
t50-F-18	Companion to patient	Det ligger jo midt på kjøkkenbenken hans liksom, så… Vi kan vel følge med lite grann mer på det og så kan vi diskutere litt hva vi kanskje synes. For vi er jo mye der og… **It is lying in the middle of his kitchen table so… I suppose we could keep an eye on it too and then we can discuss what we think. Because we are there a lot and…**	
t50-F-19	Doctor (GP)	Ja. Nei for jeg skjønner jo det for *pasientens navn* også, du synes jo… det er jo sikkert godt å kunne styre og holde på det selv liksom. **Yes. No, because I understand that for *patient name* too, you think that…it is probably good to manage and keep track of it yourself as such**	Co-reasoning about adherence support.
t50-F-20	Patient	Ja ja ja **Yes yes yes**	
t50-F-21	Doctor (GP)	Og hvis det fungerer så er jo det greit. Men hvis det blir sånn at det blir for ofte at du glemmer det så er det jo… **And if that works then that is fine. But if it becomes that too often you forget to take it then it is …**	Co-reasoning about adherence support.
t50-F-22	Patient	Pfh..Jeg glemmer det vel en gang i uka. **Pft…I forget it once a week I suppose**	
t50-F-23	Doctor (GP)	Men kan ikke dere også følge litt med, og så kan vi jo holde litt kontakten. **But why don't you keep an eye on it, and then we can stay in touch.** [closing remarks]	Doctor suggests to "wait and see".

S4 NO/ENG Translation of illustrative example of unaddressed redflag-topic

In redflag-topic 2, the patient discloses a negative adverse effect when taking bumetanide, a diuretic medication, at home. The patient disclosed the topic in two separate consultations to different doctors (t2-W-8, t2-D-1). Investigating the first ward visit, we observe that the doctor provides emotional support (t2-W-9) before pursuing a biomedical issue about the medication (t2-W-11, t2-W-13). According to our definitions, the redflag-topic is unaddressed since the doctor did not explore the scope of the problem and supportive actions were limited to emotional alignment. We found the same outcome analysing the discharge visit; doctor's responses were limited to emotional (t2-D-2) and cognitive alignment (t2-D-4), before changing the topic (t2-D-6).

Redflag-TOPIC 2: Patient reports medication limiting daily activities. Indicated adherence barrier: Negative experience			**Coding notes**
Line	**Speaker**	**FIRST WARD VISIT IN HOSPITAL**	
t2-W-1	Doctor (HD)	Og så får du også litt sånn vanndrivende medisiner for å tisse ut noe av det vannet som du har ekstra. **And then you also got diuretic medications to pee out some of the water that you have extra**	
t2-W-2	**Patient**	Veldig lite tissing egentlig da. **Very little peeing really**	
t2-W-3	Doctor (HD)	Det er det? **It is?**	
t2-W-4	Patient	Ja **Yes**	
t2-W-5	Doctor (HD)	Du har ikke tisset noe ekstra siden du kom inn hit? **You have not peed more since you were admitted to the hospital?**	
t2-W-6	Patient	Nei jeg synes ikke det er noe ekstra akkurat nei. **No I don't think so no**	
t2-W-7	Doctor (HD)	Men hvordan er det hjemme? **But what is it like at home?**	
t2-W-8	Patient	Ja det er… med en gang jeg har tatt de pillene så må jeg på do de nærmeste 3-4 timene. Men det kommer ikke sånn… det er ikke mye da. Men jeg må på do. Jeg kan ikke planlegge noen aktiviteter akkurat. **Yes it is… straight after I have taken those pills [bumetanide prescribed for use at home] then I have to go to the toilet the next 3-4 hours. But it does not come … it is not a lot though. But I must go to the toilet, I cannot plan any activities as such**	(Patient's first disclosure about this specific adherence problem in the consultation)
t2-W-9	Doctor (HD)	Nei det er jo litt kjedelig da. **No that is a bit of a nuisance**	Doctor aligns emotionally with redflag-topic.
t2-W-10	Patient	Ja det er det, men sånn er det jo da. **Yes, it is. But that's how it is**	
t2-W-11	Doctor (HD)	Hvilken farge har det du tisser, er det lyst eller mørkt? **Which colour is your urine, is it light or dark?**	Doctor seeks additional biomedical information about the effect of the medication.
t2-W-12	Patient	Det er helt vanlig farge. **It is normal colour**	

t2-W-13	Doctor (HD)	Det har ikke vært noen endring i fargen i det siste? **There have not been any changes to the colour recently?**	Doctor seeks additional biomedical information about the effect of the medication.
t2-W-14	Patient	Nei **No**	
t2-W-15	Doctor (HD)	Det er jo fint. Jeg tenker jo at du får litt ekstra her og så tenkte vi å følge litt med på vekten din. Vet du hva du har veid den siste måneden hjemme? **That is good. I think that you are getting some extra here and then I thought we could keep an eye on your weight. Do you know what you weighed the last month at home?**	Doctor pursues another biomedical issue/topic. WRITTEN ADHERENCE SUPPORT: No additional support provided.
Line	**Speaker**	**DISCHARGE VISIT FROM HOSPITAL**	
t2-D-1	Patient	Den *bumetaniden* er noe fanteri også. **That *bumetanide* is "some trickery" as well**	(Patient's first disclosure about this specific adherence problem in the consultation)
t2-D-2	Doctor (HD)	Ja, det er ikke så lett når man må tisse hele tiden. **Yes, it is not so easy when you have to pee all the time**	Doctor aligns emotionally with redflag-topic. Functions as a non-committal response.
t2-D-3	Patient	Nei, hvis vi skal ut på et eller annet så… **No, if we are going out to do something then…**	
t2-D-4	Doctor (HD)	Ja, det er litt sånn invalidiserende. Jeg vet det. **Yes, it is debilitating. I know**	Doctor aligns emotionally and cognitively with redflag-topic. Functions as a non-committal response.
t2-D-5	Patient	[liten pause] Nei men greit. **[slight pause] No, but fine**	
t2-D-6	Doctor (HD)	Er det noe du lurer på? **Is there something else you would like to know?**	Doctor makes a topic change. WRITTEN ADHERENCE SUPPORT: No additional support provided.

S5 NO/ENG Translation Table 5:

Patients signals of unacceptability to doctor's supportive action

REDFLAG-TOPIC	Doctors' supportive action	Doctors' utterance	Patient response	Coding notes
Redflag-topic 5: Patient is worried about having (too) many medications.	Provides information about necessity of medications and indicates potential reduction in number of medications if symptoms changes.	Altså mye av det er jo… altså i hvert fall 3 av medisinene er for å få pulsen din ned, hjertefrekvensen din. Så det er godt mulig de kanskje blir fjernet. Så det kan bli mindre medisiner. **So a lot of it is…at least three of the medications are to bring your pulse down, your heart rate. So it is quite possible that that they might be removed. So there may be less medications.**	Jo det kan være… kanskje jeg kan få ny medisin fra *sykehuset* også nå. **Yes it could be…maybe I can get new medications from the hospital too now.** (repeats being worried about too many medications later in the consultation.)	The patient did not seem convinced by information provided.
Redflag-topic 24: Patient does not understand need for medication and experiences side-effects of medication.	Provides information about benefits and necessity of medications.	Det er jo fordi du har kjent koronar sykdom fra før. Så hos deg så vil vi ha veldig strengt mål på kolesterolet. **It is because you have known coronary disease from before. So with you we would like to have a very strict target on your cholesterol.**	Jeg har skjønt det da. **I have understood that.**	The patient response indicated prior knowledge.
		Jeg så kolesterolet ditt var på 1,2, det der farlige kolesterolet, LDL-kolesterolet. Det er jo fint. Det er egentlig veldig lavt. Men hos deg som har kjent koronar sykdom, og som har hjertesvikt på grunn av det, så er det målet at du skal være under 1,4. **I noticed your cholesterol was at 1.2, that is the dangerous cholesterol, LDL-cholesterol. That is good. That is actually very low. But with you who have a known coronary disease, and who has heart failure because of that, then the target is that you should be below 1.4.**	Jeg er under 1,4. **I am below 1.4.**	The patient did not seem convinced by information provided.

	Indicates possibility to reduce dose in the future.	Det er du. Men det kan jo være litt sånn greit for deg å være klar over at hvis du skulle merke noen bivirkninger av den *atorvastatin* som du bruker, så kan det være mulig å redusere litt på dosen nå som du starter opp med *amiodaron*. Vi har ikke gjort noen endringer nå, men… **That you are. But it can be useful for you to be aware that if you should notice side-effects of that *atorvastatin* that you use, then it can be possible to reduce the dose a bit now that you have started with *amiodarone.* We have not made any changes now, but..**	Ja. Nei men altså når jeg tenker… og litt mindre, fordi den tar enormt med energi altså. **Yes. No, but really when I'm thinking… and a little less, because it drains a lot of energy.** At jeg ikke eier energi. Du må kjempe for alt, for å klare å gjøre noe. Og det synes jeg er slitsomt. **I have no energy. You have to fight for everything, to manage to do something. And I think it is exhausting.**	The patient provides counter-arguments, emphasising current adverse effects.
Redflag-topic 16: Patient expresses negative stance to new dosing schedule and later discloses omitting doses.	Provides information about benefits and necessity of medication.	Det skjønner jeg. Men problemet er at hvis du ikke bruker den [bumetanid] så begynner hjertet ditt å svikte litt mer og mer. **I understand that. But the problem is that if you do not use it [bumetanide] then your heart begins to fail a little more and more.**	Ja, ja, hvis jeg er hjemme og sånn så er det jo greit, ikke sant. Men hvis jeg skal lange veier i bil og sånn da er jeg nødt til å skyve litt på den. **Yes, yes, if I am home then its fine, right. But if I am going long distances in the car and such, then I will have to push it a bit.**	The patient provides counter-arguments and suggests other supportive measures for the doctor's consideration.
Redflag-topic 19: Patient is unable to report medications in use during medication reconciliation, hospital has misplaced medication list given by patient to ambulance personnel.	Provides prompts to trigger memory of medication names and number of daily medications.	Men så står det også at du har brukt en tablett som heter *spironolactone*, - spironolakton. Kan du huske det? **But then it also says that that you have used a tablet called *spironolactone*, - spironolactone. Can you remember it?**	Nei det husker jeg ikke skjønner du. **No I don't remember that, you understand.**	Ineffective prompts; the patient is unable to provide reliable information about medication use.
		Det står også her [legens notater] at du bruker en som heter Lerkanidipine. **It also says here [doctors notes] that you use one called Lerkandidpine.**	Jeg synes jeg kjennes… navnet høres kjent ut. **I think that sounds…the name sounds familiar.**	
		Husker du hvor mange blodtrykksmedisiner du tar totalt? **Do you remember how many blood pressure tablets you take in total?**	Er ikke det tre tror jeg. Eller er det flere? **Isn't it three I think. Or are there more?**	

		Det kommer litt an på, for den som heter *spironolakton* den hjelper også på blodtrykket. Så hvis du regner med den, så har du 4 tabletter på den listen her da. **It depends a bit, because the one called *spironolactone* also helps with blood pressure. So if you count it, then you have 4 tablets on that list here then.**	Totalt så tar jeg vel… er det 6 eller 7 tabletter hver morgen. Men du det husker… må jeg sjekke litt selv også. **In total, I guess…it's 6 or 7 tablets every morning. But you know what I remember…I must check it a little bit myself too.**	
Redflag-topic 47: Patient reports being unable to keep overview and dispense own medications.	Discharge letter.	[Gives discharge letter to patient]	[Leser på utskrivningsnotatet] Jeg skjønner ikke en dritt av dette her. **[Reads discharge letter] I do not understand any of this.** Nei, dette må jo hjemmesykepleien få ta seg av dette **No, the home-nurse services must take care of this.**	The patient provides counter-arguments and suggests other supportive measures for the doctor's consideration.
Redflag-topic 4: Patient reports struggling to keep own medication list updated and worries about taking medication incorrectly as a consequence.	Advises patient to memorise all medications in use and continue organising medications as before.	Ja det blir ofte det. Det er veldig mange som har høyt blodtrykk og diabetes, de havner opp i et sted mellom 10 – 12 medisiner. Og så ganske friske mennesker som er i arbeid. Men det er alltid lurt selv å forsøke å huske det, huske navnene. For plutselig så kommer man oppi en situasjon… Du har jo arbeidet veldig intenst i yrkeslivet så du husker vel med tekniske ting, du har god hukommelse. **Yes, it often does. There are a lot of people who have high blood pressure and diabetes, they end up somewhere between 10-12 medications. Also quite healthy people who are still working. But it is always a good idea to try to remember it yourself, to remember the names. Because suddenly you end up in a situation…You have worked very hard in your professional life, so you probably remember technical things well, you have a good memory.**	Jeg tror jeg husker hele medisinlista. **I think I remember the whole list of medications.**	The patient does not reject the supportive measure outright, but the combination of hedging his response ("I think I remember") after disclosing information (via red-flag topic) that he feels a loss in personal control that relies on his current cognitive abilities indicates that doctor's adherence support is unlikely to improve the situation.