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Contextual Factors Affecting Adherence Revealed by Old Patients with Heart Failure in Hospital and Primary Care Interactions: A Descriptive Study

Herman Bjørnstad[1,2], Christine Frigaard[1,2], Pål Gulbrandsen[1,2], Jennifer Gerwing[2], Henrik Schirmer[3], Julia Menichetti[2]

[1]Institute of Clinical Medicine, University of Oslo, Oslo, Norway; [2]Akershus University Hospital, Health Services Research Unit, Lørenskog, Norway; [3]Department of Cardiology and Institute of Clinical Medicine, Campus Ahus, Akershus University hospital, Lørenskog, Norway

Correspondence: Herman Bjørnstad, Akershus University Hospital, Health Services Research Unit Akershus universitetssykehus HF, Lørenskog, Postboks 1000, 1478, Norway, Email hermanbj@uio.no

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Introduction: Old patients with heart failure are a vulnerable patient group facing various challenges, specifically during the transition from hospital to home. Non-biomedical factors, or "contextual factors", such as patient attitudes and social support, can influence treatment adherence. However, their role in clinical interactions is not well understood. This study aimed to identify and describe how and when these factors manifest during clinical interactions in the hospital-to-home transition.

Methods: We audio-recorded 42 old patients with heart failure admitted to hospital interacting with their physicians at: 1. the first ward visit, 2. discharge visit, 3. first primary care visit after discharge. Based on an umbrella review, we developed a list of 48 factors known to affect adherence among cardiovascular patients. Patient utterances from the recordings containing information on one of these factors (contextual indicators (CI)) were extracted and categorized according to the type of factor, mentioned impact, and being a facilitator or barrier to adherence.

Results: From the 105 audio recordings, 742 CI were identified, each interaction containing an average of 7 CI (SD = 4.2; median = 6). CI considered to have a potential impact on patient's life or adherence were overall evenly split between facilitators (n = 82, 42%) and barriers (n = 115, 58%), and both types of CI appeared in most patient trajectories. The most salient barrier CI was related to patients' concerns regarding medications side effects and regimen complexity, while CI facilitators were more commonly related to patients' knowledge, motivation and social support.

Discussion: The findings from this study provide insights for clinicians to the main types of non-biomedical factors revealed by old patients with heart failure in medical interactions, which affect their treatment adherence. Clinicians should particularly consider patient concerns regarding medications' side effects and the regimen complexity as important aspects to discuss, leveraging on motivational and social resources if present.

Keywords: patient adherence, contextual factors, audiotaped interactions, old patients, heart failure

Introduction

Patients diagnosed with heart failure are characterized by high mortality rates and frequent hospital readmissions.[1,2] The majority of these patients are also old, making it a particularly vulnerable patient group often faced with additional challenges, such as comorbidities or functional and cognitive decline.[1–3] As a result, these patients are often prescribed more than five medications, to be administered several times a day.[4,5] One of the leading explanations of unfavorable outcomes is poor treatment adherence observed among such patients.[6]

In the case of old patients with cardiovascular conditions, the relationship between treatment adherence and health outcomes is particularly well established, and one can be considered a reliable predictor for the other.[7–10] Recent

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literature reviews have reported that 10–90% of heart failure patients do not adhere to treatments, with non-adherence increasing with age.[7,9,11,12] This issue underscores a critical need for a better understanding of how to prevent and improve poor patient adherence, both in relation to patient outcomes and overall healthcare costs.

Extensive research has explored the root causes of poor adherence, including provider, patient, and medication factors.[13,14] Studies focusing on patient factors, which are often considered as "patient context", or "contextual factors", range from non-modifiable demographic factors such as ethnicity, income, and gender, to modifiable factors such as patient attitudes, health literacy and social support.[15,16] Patient context is naturally a fluid concept, with patients from different backgrounds and dispositions facing different challenges in different manners at different times. As a result, different studies define patient context in various ways.[17] Broadly, patient context can be defined as "the life circumstances and patient behaviors relevant to planning a particular patient's care".[18] In heart failure clinical guidelines, patient context has generally been referred to as comorbid conditions, socio-personal factors, personal preference, and life expectancy, and variably included into treatment recommendations.[19] While there is substantial and growing research into which patient-related, contextual factors are related to patient non-adherence,[16,20,21] less attention has been paid to which factors are actually disclosed during medical interactions and how.

The contextual factors affecting treatment adherence are most commonly examined through the use of interviews, focus groups, questionnaires, demographic data, and correlations with adherence outcomes.[2,16,22–26] These methods provide limited information about which factors occur during different clinical interactions.

Some previous studies have analyzed medical interactions to examine patient context and patient-related factors, their impact on patient outcomes and how physicians react to them, also in this case with a variety of approaches.[18,27] One of the most established approaches is the Content coding for contextualization of care (4C), a coding scheme designed in US to examine contextualized decision making in outpatient medical interactions.[18] This coding scheme quantifies contextual factors and contextualized medical decisions and has demonstrated through large scale observational studies that (1) clinicians often overlook or fail to address contextual factors, (2) clinicians can be trained in contextualizing care, and (3) improving contextualization of care amongst clinicians can significantly improve patient outcomes, and reduce costs of care.[18,28] The results from these studies implementing the 4C has demonstrated the need for better integration of patient context in clinical decision making. Currently, we lack detailed knowledge on contextual factors specifically relevant for patients with cardiovascular conditions and occurring in different types of medical interactions. By better understanding the contextual factors which are revealed to clinicians from HF patients, we can eventually increase our understanding of how and when they are addressed.

This study aimed to explore which and when contextual factors affecting adherence are disclosed by self-managing patients with heart failure, 65 years or older, during hospital and primary care medical interactions. In particular, we aimed to:

1. Identify contextual factors relevant for the treatment adherence of old patients with heart failure;
2. Asses the frequency of factors disclosed in different medical interactions;
3. Determine the types of contextual factors patients disclose;
4. Examine the potential impact of disclosed contextual factors;
5. Examine when patients disclose potentially impactful contextual factors.

Materials and Methods

Study Design

This is an explorative observational cohort study, using audio recordings of medical interactions collected at three distinct time points along the patient trajectory: 1. the first consultation after admission to the heart ward, 2. the discharge consultation from hospital, and 3. the subsequent follow-up consultation with the general practitioner (see also Frigaard, 2024).

Participants' Recruitment

To be eligible for participation, patients had to be older than 65 years, recently admitted to hospital with a heart failure diagnosis, living at home within the uptake area of Akershus University Hospital, Norway, competent to give consent to participation in the study according to medical records and professional opinion of healthcare personnel, and administrating their own medications. Exclusion criteria were patients requiring an interpreter, patients living in fully assisted care facilities, or patients who had all their medication doses administered by home care nurses.

We recruited patients at the Department of Cardiology at Akershus University Hospital (Ahus) during the weekdays (Monday to Friday). TBS identified patients fitting the study criteria by screening admission records; then, HB and CF contacted attending hospital doctors of the eligible patients and invited them to provide written informed consent to participate in the study. Finally, HB and CF approached the eligible patients, who were informed about the study, and asked to participate. General practitioners of recruited patients were informed about the study and their informed consent to participate was secured ahead of the primary care visit with their patient.

Data Collection

HB and CF completed data collection from February 2022 to February 2023. They audio recorded the medical interactions with an Olympus DS-9000 recorder and used a Livescribe Echo2Pen to make synchronized, observational notes on relevant visible actions/features. In addition, patients and doctors provided socio-demographic information, and patients completed a cognitive assessment (Montreal Cognitive Assessment (MOCA)). All recordings were transcribed verbatim and complemented with observational notes, quality checked, and anonymized.

Data Analysis

All the interactions were analyzed using a deductive approach to identify patient indications of contextual factors, based on the umbrella review. We defined "patient context" as anything that is patient-related and non-biomedical, likely to affect a patient ability or inclination to adhere to a treatment plan. We decided to use "adherence to treatment" as an indicator of relevance of contextual indicators for this patient population, given the well documented relevance of treatment adherence for the health outcomes of old patients with cardiovascular conditions.

Umbrella Review

The aim of the umbrella review was to extract non-biomedical factors from patients with cardiovascular diseases associated with adherence to the treatment plan, in order to build a reference guide that could be used for the analysis of the audio-recorded interactions. We searched the databases EMBASE, PubMed, and Web of Science for systematic reviews and/or meta-analyses with the terms "adherence" (and synonyms) and "cardiovascular" (and synonyms) in their titles or abstracts (the full search strategy is available in the Supplementary Table 1). We then screened for systematic reviews and/or meta-analyses. After excluding duplicates, 73 unique articles were screened by two researchers (HB, JM), with disagreements solved by consensus. Twenty systematic reviews and/or meta-analyses were finally included, examining an average of 37 studies per review (inclusion flow chart available in Supplementary Figure 1; final list of papers is available in the Supplementary Table 2). All patient-related non-biomedical factors mentioned in association with adherence were extracted, collapsed if similar, and grouped in domains. The result was a list of 47 factors, organized in 7 domains: (1) psycho-socio-demographic, (2) experienced/perceived medication-related, (3) experienced/perceived healthcare system-related, (4) experienced/perceived condition-related, (5) economic, (6) social support, and (7) lifestyle factors (see Table 1). The PRISMA checklist for the umbrella review is available as Supplementary Table 3.

Analysis of Interactions

The resulting list of adherence factors from the umbrella review was used as entry point into the interactions. Using a "drag-net", deductive approach, HB examined every single patient utterance during the interactions and selected those containing a reference to a factor in the list, by working on transcripts while listening to the interactions. These

Table 1 The 47 Contextual Factors and Their Seven Domains, Extracted From the Umbrella Review

Domain	Factors
1. Psycho-socio-demographic factors	Age, Gender, Education, Cognitive decline, Comorbidities, Depression and anxiety, Health literacy, Forgetfulness, Knowledge about the condition and medication, Motivation, Living conditions, Conflicting priorities, Beliefs regarding symptom monitoring, Health beliefs
2. Experienced/perceived medication related factors	Medication side effects, Medication cost, Complexity of medication regimen, Medication properties (eg, dosage form), Medication effectiveness, Trust in medication efficacy, Perceptions about medication taking
3. Experienced/perceived healthcare system related factors	Healthcare provider-patient communication, Access to healthcare, Availability of healthcare support, Multiple prescribers, Barriers to healthcare, Prescription Issues, Trust in healthcare providers
4. Experienced/perceived condition related factors	Disease severity, Asymptomatic patients, Clinical improvement, Duration of the disease, Perception about condition
5. Economic factors	Work and occupation, Employment status, Lack of housing, Cost of drugs/treatment, Poverty/income
6. Social support factors	Non-familiar social support, Support from significant others, Extended social network, Family factors (presence of family in everyday), HF support groups and programs, Attitude of significant other towards illness
7. Lifestyle factors	Exercise, Diet, Behavioral change (lifestyle modification), Alcohol and substance use

utterances, labelled as "contextual indicators" (CI), were extracted into an excel document along with the corresponding factor and its domain.

As a second step, after each CI was identified, the same researcher analyzed whether the utterance was describing a *barrier* or *facilitator* to adherence, based on how the patient referred to it in the interaction. If that information was ambiguous or insufficient, we used information from the umbrella review. If the literature evidence was also ambiguous and the evidence was conflicting or weak, we labelled it as *ambiguous*. The researcher also analyzed the reported *potential impact* of the contextual indicator, based on how the patient referred to the CI in the interaction. If the patient mentioned a contextual factor in an utterance with no indication as to its effect, this was coded as "no mentioned impact". If the patient mentioned that the CI was interfering with his/her life, meaning the patient's daily life, wellbeing or the patient general physical or psychological state, it was coded as potential "life impact". If the patient mentioned that it was interfering with his/her ability or inclination to adhere to the treatment plan, this was coded as potential "adherence impact". Table 2 presents examples of these decisions. During the analytic process a second independent coder (JM) coded a random subset of the data (20%) using the same coding scheme. The agreement between the two coders was calculated and deemed acceptable at ≥80%. Disagreements were discussed and solved by consensus, leading to adjustments to the coding framework.

Table 2 Examples of the Analysis of Contextual Indicators (CI)

Patient utterance Containing a CI	CI Factor	CI Domain	Barrier/ Facilitator	Potential Impact
P: "Yes, I get it from my GP, because there's not much fight left in me, to put it that way. I'm very depressed. I'm very terribly depressed."	Depression and anxiety	Psycho-socio-demographic	Barrier	Life
P: "Yes, it was that Buretti (bumetanide) that I used as a diuretic." D: "Yes, but you've stopped using it?" P: "I've stopped using it because I… I couldn't use it." *(the patient further explains by relating to side effects)*	Medication Side effect	Experienced/ perceived medication- related	Barrier	Adherence

(*Continued*)

Table 2 (Continued).

Patient utterance Containing a CI	**CI Factor**	**CI Domain**	**Barrier/ Facilitator**	**Potential Impact**
P"Yes, no, I think ¦ And I also mentioned to you this about having a glass of wine or two." D: "That's perfectly fine".	Alcohol and substance use	Lifestyle factors	Barrier	No-mentioned impact
P: "It's (spouses name). She arranges and puts in the boxes according to the list we have."	Support from significant others	Social support factors	Facilitator	Adherence

Finally, when all information was collected and organized into an excel document, including de-identified patient and doctor characteristics, we performed descriptive and inferential statistics using R, from which only significant results ($p < 0.05$) are reported. Missing data primarily involved medical interactions such as the discharge or GP visits not being recorded. These missing data appoints were treated as absent, with averages and proportions calculated with the available data. No patient demographic data was missing, with the exception of the Montreal cognitive assessment score, which was completed by 34 out of 42 patients.

Ethical Considerations

This project was considered exempt from review by the Regional Committee for Medical and Health research ethics (ref: 273688). Studies on clinical communication are to be exempt from review as patients are not subject to risks from the research; Region: REK South-East A, Committee Chair: Prof. Dr. Knut Engedal, Regional Committee for Medical and Health Research Ethics (REK).

Data collection and handling was approved by the Data Protection Officer at Ahus (ref: 2021_146) and performed within the ethical and regulatory parameters set by the data protection officer (PVO) at Ahus and the general data protection regulations (GDPR). This study complies with the principles outlined in the Declaration of Helsinki. Written informed consent was collected from all participants in the study, including consent for anonymized responses/quotes to be published. Transcripts and de-identified data including transcripts, medical journals and demographic data was stored in the University of Oslo's Services for sensitive data (TSD).

Results

Participant Characteristics

We collected and analyzed 105 medical interactions from a group of 42 patients meeting 64 physicians sequentially: 42 first ward visits, 36 discharge visits, and 27 GP visits. Mean duration of visits was 16 minutes (sd = 7.68) (first ward visits lasted on average 15 minutes, discharge visits 12 minutes, and GP visits 23 minutes). Patients had a mean age of 79 years, 11 (26%) of whom had no previous history of heart failure. At discharge, patients were prescribed on average 9.4 medications, with an average change of 2.4 new medications from when they were admitted to hospital. Most patients (79%) reported being solely responsible for administrating their medications. The study included 39 hospital doctors with an average of 4.9 years of practice, and 25 general practitioners, with an average of 20.5 years of practice. Further patients' and doctors' characteristics are shown in Table 3.

Distribution of Contextual Indicators

We identified 742 patient-reported CI and found that, on average, each medical interaction contained 7 CI (median: 6, sd: 4.2). All patients and every medical interaction revealed at least one CI. We observed that the mean, median, and standard deviation of CI for each visit was highest for GP interactions (mean: 8.6, sd: 3.9) and lowest for discharge (mean: 5.8, sd: 3.7), aligned with their respective durations (see Table 4). Average duration of each interaction and count of CI were also positively correlated (0.67, $p < 0.001$).

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Table 3 Patient and Doctor Characteristics

Patient Characteristics (n = 42)	**N (%); mean ± SD**	
Age (Y)	79.4 ± 6.4	
Women	11 (26%)	
Marital status: Cohabiting / Married / Registered partner	25 (59%)	
Education level:		
Primary school	7 (17%)	
High school / Vocational school / Gymnasium	15 (36%)	
Bachelor's degree or equivalent (3 years)	10 (24%)	
Master's degree or equivalent (5 years) or higher	5 (12%)	
Montreal Cognitive Assessment (MoCA) Score (range 0–30; <26 signals a cognitive impairment)	23.5 ± 3.8	
Patients with no history of Heart Failure	11 (26%)	
Ejection fraction (EF%) at Discharge	36.7 ± 12.8	
Number of Diagnoses at discharge	3.2 ± 1.5	
Number of medications at discharge	9.4 ± 3.2	
Average change in medication from admission to discharge	2.4 ± 3.2	
Help with Medications:	N (%)	
None. I take responsibility for handling my own medications	33 (79%)	
Relatives help me with my medications	5 (12%)	
Home care services help me with my medications	2 (5%)	
Other	2 (5%)	
No previous work experience in healthcare	36 (86%)	
Not Currently Employed	37 (88%)	
Doctor characteristics (n = 64)	**Hospital Doctors**	**General practitioners**
No.	39	25
Women, No. (%)	28 (71.8%)	9 (36%)
Age, Mean ± SD	37.2 ± 17	56.1 ± 18.5
Years of Practice, Mean ± SD	4.9 ± 6.6	20.5 ± 13.1
Doctors who received communication training after medical school, No. (%)	9 (23.1%)	5 (20%)

Table 4 Rate of Contextual Indicators for the Different Visit Types

Consultation	CI Average	CI Median	CI SD	Average count CI/min
First ward visit (n = 42)	7.2	6	4.6	0.47
Discharge (n = 36)	5.8	5	3.7	0.46
GP visit (n = 27)	8.6	8	3.9	0.40

Characteristics of Contextual Indicators

CI were evenly distributed between being potential barriers or facilitators to adherence. Out of 742 CI, 48% were facilitators, 41% were barriers, and 10% were ambiguous. All patients displayed a contextual facilitator, and the majority of patients (n = 40/42) reported a contextual barrier at some point.

Overall, the psycho-socio-demographic domain accounted for about one-third of all CI, followed by the experienced/perceived medication-related domain. Within the barriers, the experienced/perceived medication-related domain was the most prevalent, with medication side effects (n = 57; 18%), revealed by 22 patients, and complexity of the medication regimen (n = 37; 12%), which was revealed by 17 patients, being the most frequent factors. Within facilitators, the psycho-socio-demographic domain was the most frequent, with knowledge about the condition and medication (n = 39;

Table 5 Distribution of CI Across Domains

CI Domain	Ambiguous (N=77)	Barrier (N=306)	Facilitator (N=359)	Overall (N=742)
Psycho-social-demographic factors	23 (29.9%)	102 (33.3%)	107 (29.8%)	232 (31.3%)
Experienced/perceived medication related factors	4 (5.2%)	106 (34.6%)	32 (8.9%)	142 (19.1%)
Experience/perceived healthcare system related factors	2 (2.6%)	55 (18.0%)	53 (14.8%)	110 (14.8%)
Social Support Factors	1 (1.3%)	14 (4.6%)	87 (24.2%)	102 (13.7%)
Lifestyle Factors	5 (6.5%)	16 (5.2%)	63 (17.5%)	84 (11.3%)
Experience/perceived Condition related factors	35 (45.5%)	8 (2.6%)	16 (4.5%)	59 (8.0%)
Social and Economic Factors	7 (9.1%)	5 (1.6%)	1 (0.3%)	13 (1.8%)

36%), revealed by 25 patients, and motivation (n = 27; 25%), revealed by 16 patients. Social support and lifestyle factors, such as exercise and support from significant others, were also frequently reported as facilitators.

The distribution of CI across domains is detailed in Table 5.

Characteristics of Contextual Indicators Across Visits

When examining barrier/facilitator CI across visits, we found that both the first ward visit (47% CI facilitators) and the discharge (56% of CI facilitators) contained slightly more facilitators than barriers, while the GP (49% CI barriers) visit had a slightly higher frequency of CI reported as barriers (see Figure 1). There was little difference in the number of patients who revealed CI between the consultation types, except for the discharge interaction, where all patients except

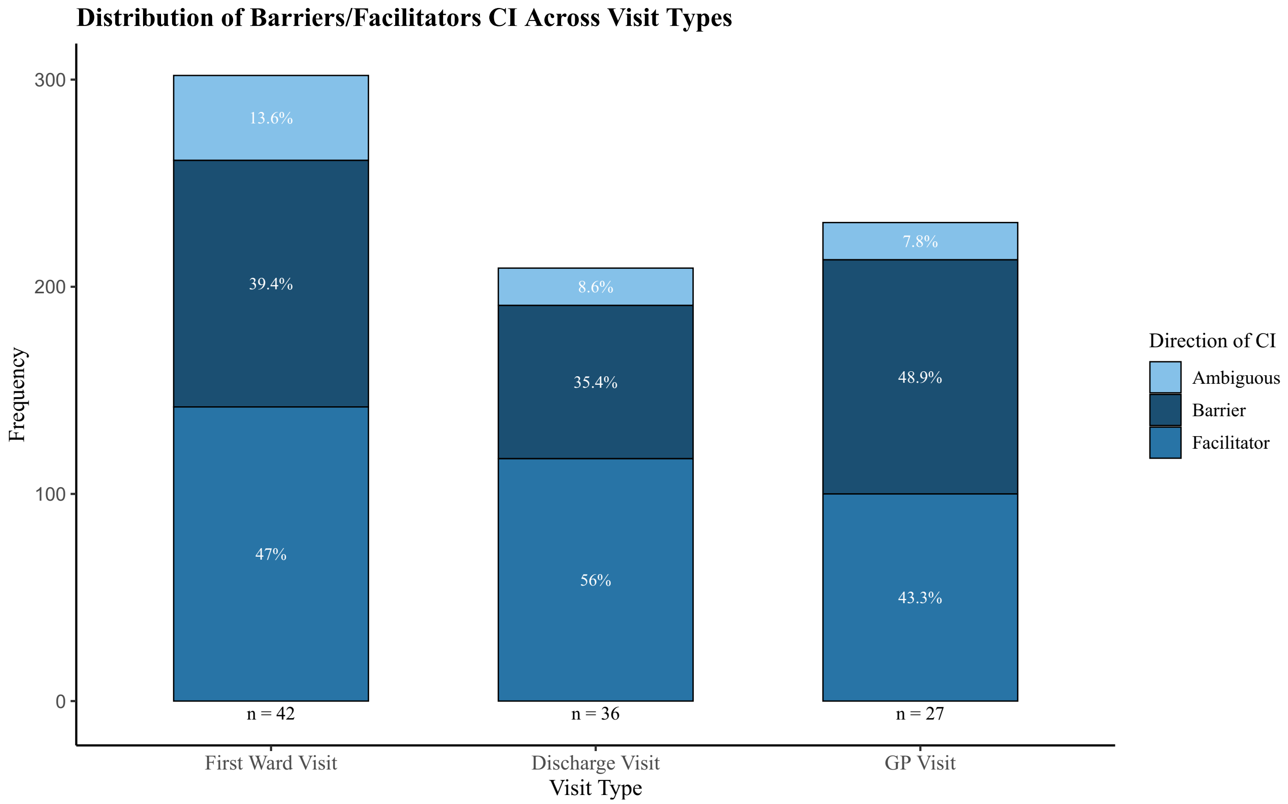

Figure 1 Distribution of Contextual barriers vs facilitators across visits (n = 742).

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one revealed a contextual facilitator (similar to the other interactions), but only two out of three patients (n = 29; 69%) reported a contextual barrier (while all of them reported a barrier in the GP visit and almost all of them in the first ward visit).

When looking at the types of CI across interactions, we did not observe clear differences in terms of CI domains more frequently discussed in certain visits.

Potential Impact of Disclosed CI

When looking at the potential impact of the CI (meaning if the patient oriented to the CI as influencing their life or their ability to adhere to the treatment plan), we found that 165 of all the CI were mentioned by the patient as having a life impact (22.2% of all CI) and 39 as having an adherence impact (5.3%). In the remaining 538 (72.5%), the patient did not make any mention to a possible impact of the CI on their life. Out of all the impactful CI, 115 (58%) were considered as barriers to adherence, while 82 (42%) were considered as facilitators.

Approximately one-fifth of the CI facilitators were mentioned as having a life or adherence impact (n = 82; 22.9%), which were displayed by 34 patients in almost half of interactions (n = 52; 49.5%). These were in particular the factors “support from significant others” (n = 16), “motivation” (n = 12), and “knowledge about the condition and medication” (n = 9).

A higher portion of barrier CI were mentioned as having a life or adherence impact (n = 115, 37.6%), with 31 patients reporting them in half of the interactions (n = 55; 52.4%). The majority belonged to the domain “experienced/perceived medication-related factors” and, in particular, the factors “medication side effects” (n = 35) and “complexity of medication regimen” (n = 10). Frequency of specific life/adherence impacting CI can be found in Table 6.

Table 6 CI With a Life or Adherence Impact Across Types of Factors (Only >2.5% are Reported)

Contextual Indicator Factor	Barrier (N=115)	Facilitator (N=82)	Overall (N=197)
Medication side effects	35 (30.4%)	0 (0.0%)	35 (17.8%)
Support from significant others	0 (0.0%)	16 (19.5%)	16 (8.1%)
Motivation	3 (2.6%)	12 (14.6%)	15 (7.6%)
Knowledge about the condition and medication	4 (3.5%)	9 (11.0%)	13 (6.6%)
Complexity of medication regimen	10 (8.7%)	0 (0.0%)	10 (5.1%)
Behavioral change (lifestyle modification)	3 (2.6%)	6 (7.3%)	9 (4.6%)
Perceptions about medication taking	2 (1.7%)	7 (8.5%)	9 (4.6%)
Availability of healthcare support	0 (0.0%)	9 (11.0%)	9 (4.6%)
Social Support	3 (2.6%)	6 (7.3%)	9 (4.6%)
Depression and anxiety	8 (7.0%)	0 (0.0%)	8 (4.1%)
Forgetfulness	8 (7.0%)	0 (0.0%)	8 (4.1%)
Prescription Issues	8 (7.0%)	0 (0.0%)	8 (4.1%)
Health Literacy	0 (0.0%)	6 (7.3%)	6 (3.0%)
Beliefs regarding symptom monitoring	0 (0.0%)	6 (7.3%)	6 (3.0%)
Conflicting priorities	5 (4.3%)	0 (0.0%)	5 (2.5%)
Disease severity	3 (2.6%)	0 (0.0%)	3 (1.5%)
Factors below <2.5%	23 (20.0%)	5 (6.1%)	28 (14.2%)

When are Potentially Impactful CI Disclosed?

When focusing on potentially impactful CI on life or adherence, we observed that a similar average frequency of CI per visit occurred in the hospital ward visits and the GP visits (2.19 on average per visit), while the discharge visits contained a substantially lower average (1.47 on average per visit).

The average of impactful facilitators was similar among the three visit types (first ward visit = 0.81, discharge visit = 0.75, GP visit = 0.78). Conversely, the average of impactful barriers discussed was higher in the GP visits (1.41 on average per visit), followed by first ward visits (1.24) and discharge visits (0.69), with similar patterns per number of patients disclosing them across the visit types. When examining the proportion of patients who reported impactful barrier in the different consultation types, we found that roughly 60% of patients reported life or adherence impactful barriers during the first ward visit and the GP visit, while 40% of patients reported them during the discharge visit. As for impactful facilitators, 60% of patients reported impactful facilitators during the GP visit, while roughly 45% of patients reported impactful facilitators during the first ward visit and discharge visit.

When examining whether patients repeated the same CI across consultations, we found that all patients with more than one recorded consultation (n = 38) repeated at least one CI across the consultations. While 18 patients repeated the same impactful contextual barrier in more than one consultation, 21 patients repeated the same impactful contextual facilitator across consultations.

Medication side effects was the impactful contextual barrier most repeated by patients across consultations, and it was the most prevalent, constituting 36% of all impactful barriers for the first ward visit (n = 19), 28% of the discharge (n = 7), and 24% of the GP visits (n = 9). Individual count for impactful facilitators across the consultations showed a more varied situation, with the most frequent in the first ward visits being "knowledge about the condition and medication" (17.6% of all factors; n = 6), "motivation and support from significant others" in the discharge visits (25.9%, n = 7), and, for the GP visits, "support from significant others" (28.6% of all impactful facilitator CI's; n = 6). Support from significant others and knowledge about the condition and medication were also the most repeated impactful facilitators across consultations.

Discussion

In this study, we uncovered that old patients with heart failure disclose a large variety of contextual barriers and resources relevant to their adherence during clinical interactions, and that most indications of impactful barriers to adherence relate to patients' experiences and perceptions of their medications, particularly their side effects. Patients' indications of impactful barriers to adherence were less common in discharge visits compared to first ward visits and post-discharge GP visits.

First, we observed that all patients disclose most adherence factors (40 out of 47) from our umbrella review during at least one clinical interaction, spanning all the seven domains. Patients clearly referred to one-fifth of these CI as having an impact to their life or their treatment adherence. Weiner et al's 2020 study found that 67% of 4,496 recorded clinical interactions included at least one red flag (defined as "a clue that something in a patient's life situation might be impacting their care").[28] If we compare our impactful contextual barriers to these red-flags, the range of both patients (74%) and consultations (53%) reporting impactful barrier CI are close to that of Weiner et al's study. This comparison suggests that while overall adherence-related contextual factors were highly prevalent in our sample, the presence of significant indications of barriers aligns with previous research.

Some of the most salient contextual barriers identified, such as medication side-effects or complexity of medication regimen, may be related to the high number of average medications our patients were prescribed at discharge (9.4 ± 3.2), as well as the frequency of co-morbidities (3.2 ± 1.5). The fact that patients mostly discuss medication-related factors as barriers to adherence is consistent with the challenges of polypharmacy inherent to our population (eg adverse drug effects or incorrect medication taking).[29] However, we did not find a positive correlation between number of medications at discharge and frequency of medication-related CI, which could be due to the fact that all our patients were prescribed several medications or that the number of medications is not necessarily the most salient explanatory variable for patients reporting medication-related CI.

We also found patients discussing several other contextual factors commonly considered prevalent barriers to adherence, such as forgetfulness, depression and anxiety, as well as several social and health care system-related factors.[26,30–33] However, certain economic, lifestyle, and experienced/perceived condition-related factors were rarely brought up by patients as barriers, despite their prevalence as barriers in previous literature.[16,22,31,32] Also, contextual facilitators were mentioned as frequently as barriers, and especially support from significant others, motivation, and knowledge about the condition and medications. These differences may be due to the study being conducted in a wealthy country with universal health coverage. Also, since our study required extensive participation, this group of participants may have been more active, motivated, and less frail than usual patients with heart failure, with, for example, lifestyle representing more a resource than a barrier. However, demographic characteristics of our sample align with those from previous Norwegian studies, and even if average number of comorbidities was lower, nearly all patients had at least one.[34]

Finally, one of the major points of interest in this exploration was examining when contextual factors occur during the hospital to home trajectory, something that, to the best of our knowledge, has never been explored (outside of the MAPINFOTRANS project).[35] Consequently, our study offers a unique insight into when patients reveal important contextual factors relevant for their treatment. When examining the proportions and frequency of all CI across the three types of medical visits, we found no significant differences (still, the GP visit had an overall higher frequency of barriers compared to facilitators). When limiting our exploration to impactful CI, we observed that the GP visit was the place where impactful contextual barriers (but also facilitators, to some extent) were mostly brought up by patients, followed by the first ward visit, while the discharge visit was the place where these were mentioned the least. This finding could indicate that contextual factors have emerged at the start of the hospital stay, have been discussed/addressed ahead of the discharge or have remained unsolved/undiscussed at discharge and occurred again or remained relevant when patients implemented the treatment plan at home. Since we also found that patients often repeated the same CI across visits, it is possible that some of the CI remained unaddressed during the hospital stay. In a follow up study, we will explore doctors' actions to address and integrate CI in medical decisions. Differences among visit's types may also indicate that patients are less likely to reveal contextual factors barring adherence in the discharge visit, perhaps because the main task of the discharge visit is not aligned with revealing contextual factors. Indeed, discharge visit often orients towards sharing an already defined treatment plan, and recent research has shown that patients often have little time to take initiative, and old patients often remain passive during these interactions.[36,37] Our findings are also consistent with the findings of Frigaard et al's exploration of medication adherence disclosures in clinical interactions in a sub-sample (n = 25) of the same dataset, demonstrating a lower frequency of adherence disclosures during discharge compared to the first ward and the GP visits.[35]

Strengths and Limitations

This study presents several strengths, which contribute to the relevance of the findings. First, the dataset is comprised of authentic medical interactions at three key points in the hospital-to-home trajectory, providing a comprehensive view of how the patient context is revealed and becomes relevant during different medical interactions. Second, CI were identified via a systematic deductive approach, grounded in evidence from an umbrella review, thus representing in itself a useful tool for coding context in future studies with cardiovascular patients. Third, the impactful CI provide concrete indications for doctors of factors relevant for old heart failure patients to be considered when designing the treatment plan with these patients. Finally, exploring both contextual barriers and facilitators to adherence provides a more complete image of the resources and hindering factors that can make a treatment plan feasible for the patients and fit their lives.

The primary limitation of the study concerns the possible selection bias and limited generalizability due to the small sample size, the patient recruitment from a specific hospital ward, the inclusion/exclusion criteria (eg focus on patients administrating their own medications), and the fact that participation in this study required extensive participation over a longer period. For example, contextual factors that could interfere with a patient's treatment plan may also have resulted in patients' inability or refusal to participate (such as cognitive decline, conflicting priorities, or trust in healthcare providers). However, characteristics of our sample are similar to larger samples of other studies in Norway.[34] A second limitation is that several interactions were not recorded, resulting in some variability of the number of different types of clinical interactions. Furthermore, the exclusive reliance on what patients reveal in interactions may have limited the possibility to have a full overview of the actual contextual factors affecting this patient group. Lastly, by relying on a pre-determined categorization of adherence factor based on the umbrella review, certain factors may be erroneously considered as belonging to a single domain, while actually pertaining to several due to the fluid and complex nature of contextual factors.

Conclusion

This study explored what old patients with heart failure reveal about their life that could be relevant for their treatment adherence, by using a novel coding system grounded in scientific evidence. It provided a new avenue for understanding which contextual factors, and when in the patient trajectory, occur in medical interactions where heart failure patients meet different doctors over time, as well as which factors can be considered more urgent to consider, given how patients refer to their potential impact on their life or treatment adherence. Our findings indicate that patients regularly provide such indications and especially report medication-related contextual barriers to adherence, possibly linked to polypharmacy issues. This underscores the key challenge faced by this specific patient population. Further analysis of these interactions will use the contextual indicators as entry points to identify overarching contextual factors and to ascertain how and when doctors address these challenges and provide contextualized solutions, for example, medication side effects or complexity of medication regimen.

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Disclosure

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