

*A Project for the Post Hospitalization Care of Frail Patients. Tele-fra 30*

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Abstract

Frail patients discharged from internal medical wards have a high rate of readmission (30-35%) within 30 days. A pilot study was designed to determine whether telemedicine-based virtual visits can improve outcomes for these patients. The study tools include appropriate staff training, a digital form for clinical and care monitoring, and scores for quality of life and prognosis (EQ-5D, MPI). After discharge, frail patients were divided into two groups: the study group (A) was monitored via telehealth by hospital medical staff, while the control group (B) was placed under the care of community-based healthcare providers. To date, remote assistance provided by internal medicine ward staff has made it possible to reduce short-term hospital admissions (20% vs 41%) and deaths (2% vs 20%, $p < 0,05$). Perceived quality of life (EQ-5D) and prognostic score (MPI) have also improved in group A ($T4$ vs $T0$ $p < 0,001$). The internal medicine department has a new "tele" tool for transitioning frail elderly patients back to the community.

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Introduction

The unified regional pathway for supported hospital discharge was outlined and formally adopted by the Veneto Region, Italy (DGR No. 31 of April 3, 2023). It entails a process involving patient identification, notification to the Territorial Operational Centre (COT), multidisciplinary assessment, care plan development, discharge planning, and the transfer of the frail patient to a community-based setting (1). There is no single, universally accepted definition of frailty, but it generally refers to individuals with chronic illnesses, disabilities, or socioeconomic issues that affect their ability to manage their situation. These are the patients admitted to internal medicine and geriatrics wards. The objectives of the unified regional pathway for supported hospital discharge include the standardization and consistency of procedures, integration between the hospital and community-based services, continuity of care, and others [1]. Ultimately, these should lead to the shared goal of reducing short-term (30-day) readmissions.

A retrospective analysis of patients discharged from the medical departments of Azienda 3 Serenissima in Veneto (Italy) during 2025 revealed that at least 30–35% of frail patients were readmitted within 30 days, regardless of the discharging ward. The highest readmission rate was observed among patients receiving home care and those in residential care facilities. Data like ours have been reported in other settings within the Veneto region [2]. This result can be explained in several ways:

- The supported discharge pathway was recently implemented and perhaps has not yet been fully optimized.
- Community-based services are still too weak to accommodate frail patients; consequently, corrective measures have been introduced (e.g., community health centres, intermediate care facilities).
- There is a lack of continuous communication between the discharging facility (the hospital) and the receiving setting (the community).

While awaiting definitive answers, the hospital can facilitate the care pathway by using telemedicine during the post-discharge period for frail patients (for approximately 30 days). Through virtual consultations and remote support provided by healthcare

professionals, the post-discharge phase enables:

- Conduct a virtual visit at the patient's home, avoiding burdensome and hazardous travel
- Verify complete and correct adherence to the treatment regimen and make any necessary adjustments, including transmitting the treatment plan
- Administer questionnaires for the assessment of daily activities (e.g., the Barthel Index), perceived quality of life (e.g., EuroQol, EQ-5D), and prognosis (e.g., Multidimensional Prognostic Index, MPI), which are also available in digital format
- Interact with all local stakeholders regarding social care and health issues, facilitating a handover of care—particularly to the general practitioner (GP) and the family or community nurse (IFoC) [3-9].

Rationale and Objectives

Rationale

The project aims to evaluate the effectiveness of telemedicine in the post-discharge care of frail patients (for a period of at least 30 days), with the goals of ensuring continuity of care, involving all stakeholders in the supported discharge process (GP and IFoC), improving perceived quality of life, and reducing short-term hospital readmissions.

Objectives

- Use telemedicine during the post-discharge period for frail patients to assess its effectiveness in reducing Emergency Department visits, hospital readmissions, and short-term mortality.
- Compare outcomes between two matched groups of frail patients discharged from the internal medicine ward: one monitored via telemedicine after discharge (Group A-study group) and one managed by community-based services (Group B – control group).
- Compare perceived quality of life (using the EuroQol questionnaire, EQ-5D) and prognosis (using the tele-Multidimensional Prognostic Index, or teleMPI) in Group A at the time of discharge (T0) and at the end of the post-discharge period (T4).
- Monitor Emergency Department visits, hospital readmissions, and short-term mortality in both patient groups.

Materials and Methods

Patients

Frail patients discharged from the Complex Operative Unit of Internal Medicine at Dolo Hospital during 2026 are considered, based on the following criteria:

Inclusion criteria: Age > 65 years. Patient able to understand and sign informed consent for the study. Frail patient (Blaylock Risk Assessment Screening Score or BRASS >20) taking 3–5 medications and with 3–5 clinical conditions. MPI between 0.50 and 1.0

Exclusion criteria: Advanced-stage dementia. Patients unable to sign consent or participate in a video consultation, and/or lacking an effective caregiver

Table 1: Study Design and Data Collection

Study design: Telemedicine for the post-hospitalization care of frail patients (Tele-Fra 30)		
Pre-discharge (T0)	Identification of the frail patient and random assignment to Group A (telemedicine) and Group B (no telemedicine) Inclusion criteria: Age > 65 years Patient able to understand and sign the study consent form Frail patient (Blaylock Risk Assessment Screening Score or BRASS > 20) on at least 3-5 medications, with at least 3-5 clinical problems MPI > 0.50 Exclusion criteria: Advanced-stage dementia Patients unable to sign the consent form or participate in the telehealth visit, and/or lacking an effective caregiver	Instruments: EuroQol (European Quality of Life) questionnaire (EQ-5D) and Multidimensional Prognostic Index (MPI).
First, second, and third week (T1, 2, 3)	Group A	Tools: post-discharge video consultation
Fourth week (T4)	Group A	Tools: post-discharge video consultation
		EuroQol (Quality of Life) questionnaire (EQ-5D) and Multidimensional Prognostic Index (MPI)
Data collection	Group A	Tools: database, nursing chart, management control system
	Group B	

Table2: Variable

Variable (average)	Aggregates	Study	Control	p*
N. patients	78	39	39	
Age (years)	85	85,6	84,3	NS
Hospital stay (days)	15,2	13,6	16,9	NS
BRASS (n)	22,8	22	23,5	NS
Medicines (n)	7,6	8,0	7,6	NS
Medical conditions (n)	5,6	5,8	5,5	NS
MPI (n)	0,72	0,72	0,72	NS

Test U di Mann-Whitney (NS = No Significative)

Tabel 3: MPI, EQ-5D (T0 vs T4)

Variable	Study (T0)	Study (T4)	p**
MPI (n)*	0,72	0,62	≤0,001
EQ5D (n)*	13,3	10,8	≤0,001
Activity *	2,5	2,2	<0,05
Care *	2,6	2,4	<0,05
Routine activities*	2,6	2,3	<0,05
Pain or discomfort*	1,4	1,2	NS
Anxiety or depression*	1,4	1,3	NS
Global health*	2,4	1,3	≤0,001
Perceived health (%)	46	67	≤0,001

The reduction in value reflects an improvement

Test Wilcoxon

Tabel 4: 30-Day Outcome

Variable	Aggregates	Study	Control	p**
Outcome *	24	8	16	NS
Deaths	9	1	8	<0,05

Outcome: hospital admissions + ED access + deaths

Fisher exact test

Identification of frail patients and randomization (pre-discharge, T0): The physician identifies the frail patient based on the criteria set out in DGR no. 31 of April 3, 2023, and the clinical characteristics specified in the inclusion criteria. The physician provides information and obtains consent for the study and for data processing, in accordance with the procedures mandated by the ethics committee for experimental clinical practice. The nurse and physician record the EuroQol (Euro Quality of Life) questionnaire and the Multidimensional Prognostic Index, documenting them in paper or digital format. At this point, patients are randomly assigned to two homogeneous groups: Group A (study group) and Group B (control group). Upon discharge, Group A receives a link for four telehealth consultations (scheduled for the first, second, third, and fourth weeks), whereas Group B receives no telehealth consultations and relies solely on local community-based care. The discharge letter for both groups is emailed to the Territorial Operations Centre (COT), which forwards it to the general practitioner and the family or community nurse. The link for virtual consultations is shared with the participating GPs and family/community nurses, who take part on a voluntary basis.

First, second, and third weeks (T 1, 2, 3): The nurse conducts the telehealth consultation, assessing the clinical

condition and treatment adherence of the patient in Group A. During the same consultation, it is possible to interact with the local healthcare professionals treating the patient (General Practitioner and Family or Community Nurse).

Fourth week (T4): The nurse conducts the telehealth visit, assessing the clinical condition and treatment adherence of the patient in Group A. At the same time, with the assistance of the caregiver, the nurse completes the EuroQol (Euro Quality of Life) questionnaire and the tele-Multidimensional Prognostic Index, recording the results in paper or digital format.

Data collection: During the follow-up period (approximately one year), and with the assistance of the Management Control Department of Azienda 3, sensitive data regarding clinical aspects and outcomes—such as Emergency Department visits, hospital readmissions, and deaths—are entered into a database.

Working Tools

Training: The healthcare staff involved in the project receive training through a field-based program comprising both theoretical lessons and practical training. The lessons cover specific diseases, the use of assessment scores (EQ-5D and MPI), and telemedicine. The practical training focuses on conducting virtual consultations and involves a phase of collaborative work (physician and nurse) followed by a phase of independent work (nurse). The project is part of the medical department's 2026 training plan.

Database: All data collected before and after discharge are recorded in a database. Privacy regulations and the guidelines set by the company's ethics committee for clinical and pharmaceutical trials are observed.

Nursing chart: A digital nursing chart is used during each telehealth visit to record clinical parameters and perceived quality of life.

Euro Quality of Life (EQ-5D): The EQ-5D consists of two distinct sections. The first section asks for a subjective assessment across five dimensions (mobility, self-care, usual activities, pain/discomfort, and anxiety/depression), with each item offering a choice of severity levels. Responses for each item are graded from 1 to 3; level 1 indicates no problems,

while level 3 indicates extreme limitation. The second section of the EQ-5D involves an assessment using a visual analogue scale (VAS), graphically represented as a graduated scale ranging from 0 (the worst possible health state) to 100 (the best possible health state), on which the respondent indicates their perceived health status.

Multidimensional Prognostic Index (MPI) and tele MPI

Domains and scales included:

- **ADL** (Activities of Daily Living). Assesses the subject's functional abilities.
- **IADL** (Instrumental Activities of Daily Living). Assesses the subject's autonomy in performing instrumental activities of daily living.
- **Barthel MOB** (Mobility). Assesses the subject's mobility.
- **SPMSQ** (Short Portable Mental Status Questionnaire). Assesses the presence and severity of cognitive impairment in elderly subjects.
- **MNA-SF** (Mini Nutritional Assessment – Short Form). Used to identify elderly individuals at risk of malnutrition or already suffering from it.
- **CIRS-CI** (Cumulative Illness Rating Scale – Comorbidity Index). Assesses the subject's comorbidity.
- Number of medications.
- Living arrangement. Assesses the presence of social, emotional, and physical support in the subject's living environment.

Endpoint

Primary efficacy endpoints:

- Comparison of 30-day outcomes (Emergency Department visits, hospital readmissions, and mortality) between the two groups (A and B).
- Comparison of perceived quality of life scores (EuroQol questionnaire) and prognosis scores (Multidimensional Prognostic Index) within Group A, measured at time T0 and time T4

Secondary efficacy endpoints: Improvement in individual items of the EuroQol and Multidimensional Prognostic Index questionnaires (T0 vs. T4) and their correlation with clinical and non-clinical variables recorded in the nursing chart/database.

Secondary study endpoints:

- Completion of scores at times T0 and T4 (enrolled

patients/scores administered $\geq 80\%$).

- Creation of a digital form for clinical and care monitoring to be administered electronically (enrolled patients/forms administered $\geq 80\%$)

Statistical Analysis

All data are entered into an electronic database in anonymized form. The data are checked for consistency and completeness; the database is then used for statistical analysis. Results are presented as mean $\pm$ standard deviation for normally distributed continuous variables, or as median and interquartile range (IQR) for variables with a non-normal distribution. Percentages are used for categorical variables. Comparisons of groups and subgroups regarding continuous variables are performed using the student's t-test or Mann-Whitney U test, as appropriate, while the Chi-square test or Fisher's exact test is used for categorical variables. Comparisons of pre- and post-discharge variables are made using the paired t-test or the Wilcoxon signed-rank test, as appropriate.

Results

To date, 78 patients have been enrolled (39 in each group), with a mean age of 85 years. Inclusion criteria (BRASS score, number of medications, number of medical conditions) were met and were equally represented across both groups. The mean hospital stay was of 15 days in both groups. The prognostic score (MPI) at discharge (T0) indicated a severe status in both groups (see Table 2). Unlike the study group, the control group relies primarily on integrated home care services (ADI). Discharge to residential care facilities (RSA) or hospices is not included in the plan. The medical conditions are evenly distributed between the two groups and, in order of frequency, comprise cardiovascular disorders (heart failure, arterial hypertension, atrial fibrillation), endocrine-metabolic conditions (diabetes mellitus), cerebrovascular disorders (stroke, mild cognitive impairment), and osteometabolic conditions (osteoarthritis and non-disabling fractures). In the study group, 33 out of 39 patients completed the follow-up involving four telehealth visits, properly completing the nursing form and the assessment scores (EQ-5D T4, teleMPI T4). At T4, we recorded a significant improvement (reduction) in both the overall EQ-5D score and its individual components; the perception of health had improved. The MPI score also showed improvement

(reduction) at T4 (Table 3). To date, 24 outcomes have been recorded. Readmission at 30 days occurred in 41% of control patients and 20% of study patients. Mortality at 30 days was 20% and 2%, respectively (Table 4). The causes of readmission were almost always related to the conditions recorded at enrollment. A multivariate analysis to identify prognostic factors is not yet possible, both due to the small number of participants and because baseline values (T0) are equally represented in the two groups. Participation by the general practitioner in the telehealth consultation was low (10%), whereas the family or community nurse participated in 50% of the case studies.

Discussion

The pilot study on the supported discharge of frail patients (Tele-Fra 30) focused on patients with complex discharge needs, characterized by a high risk of readmission within 30 days (see BRASS) and a poor one-year prognosis (see MPI). Unlike other studies, the patient characteristics here are more representative of the typical caseload in medical wards (e.g., polypharmacy and multiple comorbidities). Although the sample is small and does not allow for a statistically significant conclusion, we can make a few observations: a) The MPI score should be added to the other criteria used to define frailty status and reassessed—including via telemedicine—once the acute phase has resolved. Indeed, the "teleMPI," already validated in the literature, has proven to be a rapid and user-friendly tool (8). The reduction in the score at T4 might be attributable to an improvement in the CIRS-CI score resulting from therapy titration during follow-up (a variable not further documented). b) The period immediately following discharge is notoriously critical; a telehealth consultation involving the entire ward team helps improve perceived quality of life (as measured by the EQ-5D) and reduces short-term readmissions and mortality. EQ-5D scores recorded at time point T4 in the study group showed improvement across the board, thanks to the periodic use of a nursing assessment tool, remote support, and ongoing caregiver training. Caregivers receive pre-discharge training, a booklet outlining recommendations and "red flags," and weekly support for a period of four weeks. c) Patient outcomes are also influenced by the remote care provided by the ward's medical staff. Through virtual consultations and nursing assessments, it is possible to monitor clinical parameters, adjust therapy (up- or down-titration),

identify red flags, and alert community services to social or care-related issues. Interaction with the IFoC improves the subsequent continuity of care provided by community services. d) Healthcare professionals working in post-hospital care can acquire new clinical and technical skills that are particularly useful for patients with complex chronic conditions. Completing nursing charts for clinical monitoring and using tools to score perceived quality of life are simple methods that can improve the care provided to frail patients.

However, the project also highlights certain critical issues:

- The number of eligible patients depends on the presence of an effective caregiver; in fact, the caregiver is often a professional carer who is not well-versed in digital technology.
- Primary care providers—specifically general practitioners—are not yet actively participating in telemedicine, resulting in a lack of support for continuity of care.
- Some patients—specifically those with a more severe prognosis—require more specialized home-based care, potentially involving palliative care services.

Conclusion

In conclusion, we can state that we have an additional tool to assist vulnerable patients during the protected discharge process. Telemedicine, in its various forms, proves useful in the immediate post-hospitalization period when implemented by a multidisciplinary team. The ability to monitor clinical status and identify social and care-related issues helps reduce short-term readmissions and improves perceived quality of life.

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