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Development of an integrated care pathway for the prevention and management of biopsychosocial frailty in community-dwelling older adults in Italy: The PDTCP model

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Abstract

Background: With the accelerating demographic transition and rising prevalence of biopsychosocial frailty among older adults, there is a growing need for integrated care models. Italy, among the oldest countries in Europe, faces increasing healthcare costs and a high burden of chronic conditions in the elderly.

Objectives: This study presents a Prevention and Diagnostic Therapeutic Care Pathway (PDTCP) aimed at the early identification and management of biopsychosocial frailty in community-dwelling individuals over 65 years of age.
Methods: The PDTCP is a multidisciplinary model based on multidimensional assessment tools (SFGE and Sunfrail+), enabling risk stratification and tailored interventions. The pathway includes early detection, personalized care planning (PCP), coordination with general practitioners, and structured follow-up. Implementation involves a dedicated governance structure and community engagement initiatives. Outcome indicators include reduced emergency visits, hospitalizations, and institutionalizations.
Results: While currently at the design and implementation phase, the PDTCP targets key performance indicators such as 90% PCP drafting in frail/pre-frail patients, 20% reduction in ER visits, hospitalizations, and falls, and 80% uptake of care plans. A logic model and operational protocol support systematic evaluation.
Conclusions: The PDTCP provides a comprehensive and person-centered framework for managing frailty in aging populations. Further validation through pilot implementations and outcome evaluation is needed to confirm its impact and scalability.

Take-home message: The Prevention and Diagnostic Therapeutic Care Pathway (PDTCP) offers a comprehensive, multidisciplinary, and person-centered approach to manage biopsychosocial frailty in community-dwelling older adults, aiming to promote healthy aging, reduce healthcare burdens, and improve quality of life through early identification, personalized care, and integrated services.

Keywords: Frailty; integrated care; multi-dimensional assessment; older adults; prevention; personalized care.

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INTRODUCTION

The world is experiencing a progressive increase in the proportion of people over 65 years of age, driven by rising life expectancy [1-3]. This demographic shift is a global phenomenon, particularly pronounced in Europe, North America, and parts of Asia, with countries such as Japan, Germany, and the United States also facing significant aging populations [4]. In particular, the demographic profile of the European population is undergoing profound changes, with a progressive increase in the proportion of people over 65 years of age, due to increased life expectancy [1-3]. This phenomenon is particularly pronounced in Italy, which ranks among the oldest countries in Europe, with an elderly population exceeding 20% of the total. Concurrently, there has been a shift in the epidemiological profile of diseases, with a rising incidence of chronic-degenerative conditions, often occurring simultaneously in the same individual [5,6]. This context is particularly concerning because it often leads to disability, which places an additional strain on healthcare systems worldwide. These pressures are compounded by rising healthcare costs, with increasing demands for assistance services and the complexity of health needs among the elderly population [7-9].

To address this growing challenge, countries across the world have adopted frameworks aimed at preventing and managing frailty in the elderly. For instance, the Prevention and Diagnostic Therapeutic Care Pathway (PDTCP) focused on managing biopsychosocial frailty, aims to reduce the burden on healthcare systems while simultaneously ensuring that the elderly population enjoys more disease-free years. This approach promotes healthy and active aging [10], which can be achieved by

preventing frailty or managing it optimally when it occurs. The ultimate goal of these frameworks is the early identification of frailty to slow, and potentially reverse, progression toward functional decline and its associated complications.

Frailty is a characteristic condition of the elderly and plays a central role in geriatric medicine. Consequently, it has been the subject of numerous studies leading to various definitions over the years.

In recent years, Gobbens et al. have emphasized a bio-psycho-social paradigm, defining frailty as "*a dynamic state affecting an individual, characterized by losses across one or more functional domains (physical, mental, social), caused by multiple factors, which collectively increase the risk of adverse health outcomes*" [11]. A recent consensus meeting defined physical frailty as "a medical syndrome with multiple causes and contributing factors, characterized by diminished strength and endurance, as well as reduced physiological function, which collectively increase an individual's vulnerability to developing dependency and/or mortality" [12].

The only approach proven effective in preventing and treating frailty is Multi-dimensional assessment (MDA), defined as "*a multidimensional and interdisciplinary diagnostic process focused on determining the medical, psychological, and functional capacities of an elderly individual, in order to develop a coordinated and integrated plan for treatment and long-term follow-up*" [13]. The National Chronic Disease Plan [14] has identified several phases of the care pathway, including risk stratification of the reference population, evaluation of intervention priorities, definition of the most appropriate profile of social care services, health promotion, prevention and early diagnosis, management of complex patients in clinical imbalance phases through care planning, implementation of personalized interventions, and evaluation of care quality.

Globally, risk-based stratification plays a crucial role in comprehensive care for the elderly. This approach ensures that clinical, supportive, and social needs are considered in designing sustainable and personalized interventions [15-17]. Prevention, which should be proactive and capable of identifying potential risk factors early, is a key strategy.

For example, frameworks established by the Ministerial Decree 77/2022 and Law 33/2023 in Italy [18,19] have been instrumental in shaping care pathways. Similar policies and guidelines are being adapted and implemented in other countries, making it clear that a global approach is needed to address the growing challenge of aging populations and frailty. For instance, countries like the United States, Japan, and Germany have also introduced national frameworks that focus on aging, frailty prevention, and the management of chronic diseases, often involving frailty-guided clinical management, frailty screening tools, integrated care models, and population-based approaches focussing frailty transitions [20].

Similarly, in Japan, frailty management involves using screening tools such as the Kihon Checklist (KCL), implementing an integrated care system that combines healthcare and social services, promoting community involvement through initiatives like "Kayoi-no-ba," and prioritizing the identification of functional deficits [21]. These models emphasize early intervention, prevention, and active aging, which are now being incorporated into health policies worldwide. These international efforts underscore the need for a comprehensive, holistic response that not only focuses on improving the medical management of frailty but also addresses the social, psychological, and environmental factors that contribute to the health and well-being of older adults. Such initiatives emphasize the importance of global collaboration in developing sustainable, evidence-based solutions to support healthy aging, reduce healthcare burdens, and improve quality of life for elderly populations globally.

METHODS

Objectives

General Objective

The Frailty PDTCP aims to take responsibility for non-institutionalized elderly patients over 65 years of age and to create a model for local management of frailty. This improves access to care and specialist assessments based on individual patient needs. The specific objectives of this initiative are

to identify frail elderly individuals earlier by assessing their functional, cognitive, and social autonomy. This early identification aims to prevent disability and institutionalization by promoting active and healthy aging. Additionally, the program seeks to foster collaboration among various health and social professionals involved in the care of frail elderly individuals. A key focus is to ensure a multidimensional approach that addresses the physical, psychological, and social needs of the older adults. The initiative also strives to improve communication among elderly individuals, their families, and caregivers, which is crucial for effective care. Finally, the objective is to reduce the health and social costs associated with frailty, ensuring that the older adults receive appropriate support while minimizing the financial burden on healthcare systems.

These objectives align with the guidelines provided by Ministerial Decree 77/2022 and Legislative Decree No. 33 of March 23, 2023 [18,19], regarding policies supporting the older adults, which establish the need to create pathways for frailty prevention and care for individuals classified as frail. Such prevention must include a proactive approach capable of identifying potential risk factors early.

The 2015 World Report on Ageing and Health [22] defines the objective for successful aging as "helping people develop and maintain the functional capacity that enables well-being. This condition results from the interaction between individual psychophysical capacities and their living environment, which contributes significantly to maintaining optimal health."

Inclusion and exclusion criteria

The PDTCP is designed to address all individuals over the age of 65 who are not residing in social assistance facilities. However, the program excludes individuals under the age of 65 and those who are institutionalized, as they do not meet the eligibility criteria.

The management of the PDTCP involves a collaborative approach, with a diverse group of professionals playing distinct roles within the Multidisciplinary Team. This team includes members from various sectors, such as Organization Management, Health Management, the Prevention Department, Medical Staff, Nursing Staff, Outpatient Specialists, Administrative Staff, and Social Workers. For each district or Local Health Unit (LHU - whose Italian acronym is ASL), at least one physician, preferably a geriatrician, and at least two case manager nurses will be designated as PDTCP referents. These staff members, situated within the frailty management unit, will oversee the outpatient clinic dedicated to the PDTCP and engage in awareness events organized in the ASL area.

Personnel properly trained will be responsible for administering the first questionnaire to assess frailty and referring appropriate cases to the second evaluation step. Patients classified as "robust" will continue with annual follow-ups and, with their consent, may also participate in lifestyle counselling. In the case of patients categorized as "pre-frail," "frail," or "very frail," or based on the physician's discretion, suitable diagnostic and therapeutic pathways will be recommended.

Responsibility matrix

Table 1 outlines the distribution of tasks among the key professionals involved in the planning, implementation, and monitoring phases of the PDTCP.

Table 1. Assignment of responsibilities in the PDTCP framework.

Tasks/Roles	**Primary Care Dept.**	**ASL Admin Personnel**	**Health/Corporate Management**	**ASL Medical Staff**	**Specialist Physician**	**Nursing Staff**	**Social Workers**	**GP**
PDTCP Drafting			R/A					
PDTCP Verification and Approval			R/A					
PDTCP Dissemination			R/A					
Recruitment	R/A	C	I	C	C	C	C	C

Welcoming			A			R	R	
Informed Consent			R/A			R	R	
MDA I° (First Multidimensional Assessment)	A					R	R	
MDA II° (Second Multidimensional Assessment)	A			R		R		
PCP Drafting (Personalized Care Plan)	A			R		R	R	I
Specialist Visit	R/A		I		R	C		I
Follow-up	R/A	C						I
Monitoring			R/A			C	C	
Data Storage			R/A					

Note: **R** = Responsible; **A =** Accountable; **C** = Consulted; **I** = Informed

Program Activities

The core components of the PDTCP are outlined in Table 2, which summarizes all planned activities, responsible personnel, procedures, and objectives.

Table 2. Summary of program activities.

ACTIVITY	**WHO**	**HOW**	**WHEN**	**WHERE**	**WHY**	**Documents /Records**
Access to the PDTCP	GP	Call to dedicated personnel	When identifying a potentially frail patient not yet assessed	Email and Phone number	To facilitate patient care and assessment	Booking format
	PUA (Single Access Point)	Call to dedicated personnel Email to the indicated address	When patient accesses district and/or municipal help desks	PUA district help desks	To facilitate patient care and assessment	
	Organizatio n personnel	Call to dedicated personnel number	When identifying a potentially frail patient not yet assessed	Email and Phone number	To facilitate patient care and assessment	
	Self-referral	Communica tion via email	During dedicated open days and awareness events	Email Other contacts	To ensure easy access to the PDTCP	

First assessment -SFGE questionnaire administration	Trained healthcare and non-healthcare personnel	After signing informed consent	During open days/awareness events	Open day venues/awarene ss day venues Clinics	To stratify patients based on care needs	Informed consent SFGE Test
First assessment -"SF+" questionnaire administration	Dedicated healthcare personnel	If deemed frail or pre-frail			Second level Multidimension al Functional Assessment	SF+ Test
Prescription of diagnostic investigations	Medical personnel				To complete the diagnostic-therapeutic framework	Registration form
PCP (Personalized Care Plan) drafting	District medical-nursing personnel		At the conclusion of the 2nd level assessment	District Services	To plan the patient's therapeutic care pathway	PCP scheme
In-depth examinations	Specialist in the field	Inclusion in the quota of service flows dedicated to the PDTCP	Booking by the PDTCP case manager/prescri ption by the patient	Organization clinics (if possible)	To complete the diagnostic-therapeutic framework	
Follow-up visits	PDTCP case manager	According to the PCP timeline	Call from the case manager to the patient	Open day venues/awarene ss day venues Dedicated clinic	To reassess the patient over time	

Note: SFGE – Short Functional Geriatric Evaluation (23), SF+ - SunFrail+ - (24-26), PCP – Personalized Care Plane

Operational protocol

The ASL will establish an outpatient clinic dedicated to frailty care, preferably located within the Community House (CH) premises. Patients may access it through referrals from general practitioners, other specialists, or independently, on scheduled days by prior telephone appointment or until the daily dedicated slots are filled.

Additionally, staff will participate in specific awareness events organized in the ASL area. The purpose of these events is to promptly identify cases of frailty that could result in significant disability if not addressed in a timely manner.

The intervention phases are as follows (Figure 1):

1. *Recruitment of patients and invitation to the prevention days*

   The recruitment of patients for the Prevention days involves multiple avenues for patient engagement. Patients may choose to participate voluntarily, or they may be recommended by hospital medical staff, general practitioners, or social/health territorial services. Participation requests must be submitted by patients or their caregivers within 15 days prior to the visit, using one of several booking methods: by telephone, email, or in person at the ASL counter. Once requests are received, designated administrative staff will manage the scheduling process, confirming appointments and providing details such as the date, available time slots, and the reference staff involved. Reception and registration of patients: The reception and registration of patients will take place in designated rooms (to be specified), where ASL staff will oversee the process.

   Their responsibilities include recording personal data, collecting anthropometric

measurements such as weight and height, and monitoring vital signs including blood pressure and heart rate. Additionally, ASL staff will administer informed consent forms, providing participants with privacy information and obtaining their consent for the use of their data for scientific purposes. This process ensures that all necessary information is collected before proceeding with the intervention.

2. Administration of the first-level multidimensional assessment test

The same personnel handling admission will administer the first-level "SFGE" test (23). Those classified as robust will proceed directly to phase 5. Pre-frail and frail individuals will undergo further testing as described in the next phase.

3. Administration of the second-level multidimensional assessment test

Patients identified as frail or pre-frail through the "SFGE" questionnaire will be administered the second-level "Sunfrail+" questionnaire [24-26] by healthcare personnel. This test comprises nine questions designed to investigate the bio-psycho-social sphere of the individual. In case of positive responses to one or more of the nine items, further diagnostic investigations will be performed.

4. Personalized Care Plan (PCP) development

After conducting multidimensional assessments and diagnostic investigations, healthcare personnel, in collaboration with district staff, will create a Personalized Care Plan (PCP) for each individual. This plan will outline the necessary socio-health interventions, including any further investigations and rehabilitation measures. Additionally, it will specify follow-up appointments, scheduled either every six months or annually, depending on the individual's level of frailty. A paper copy of the PCP will be provided to the patient, allowing them to share it with their general practitioner. This ensures that the interventions carried out during the prevention day are communicated and that continuity of care is maintained.

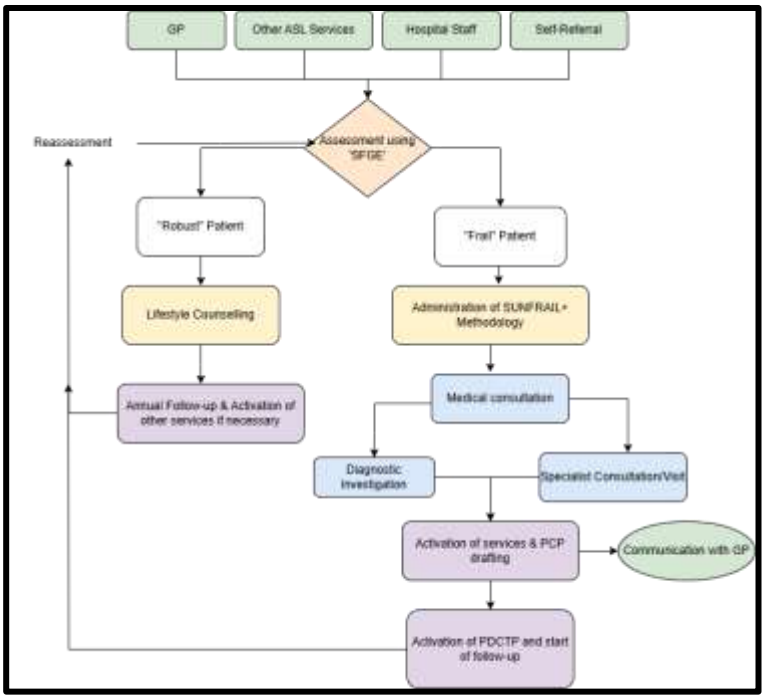
5. Specialist visits and diagnostic tests

Following PAI formulation, with all acquired information, healthcare personnel may refer frail patients for specialist evaluations through dedicated channels if necessary. Specifically, geriatric, nutritional, and ppsychiatric evaluations are considered, along with others that may be available. For this purpose, the Primary Care Department will allocate a monthly number of bookable appointments with outpatient specialists and diagnostic-therapeutic services for prevention day participants. These visits and services must be performed within timeframes compatible with follow-up scheduling (6-12 months).

6. Follow-up

Dedicated staff will be responsible for contacting participants by telephone for follow-up visits according to the timeline specified in the PCP. The participant list will be shared with prevention day organizers as described in point one.

Figure 1. FlowChart for the PDTCP.



Monitoring and Evaluation

The monitoring and evaluation of the PDTCP outcomes will be based on the measurement of several key indicators, which will be assessed on an annual basis. These indicators include the number of patients recruited into the program, with the target being an annual count. The drafting of personalized Care Plans (PCP) is expected for 90% of frail and pre-frail patients under care by the PDTCP, and specialist visits should be performed for 20% of participating patients. In terms of health outcomes, the program aims for a 20% reduction in the number of patients requiring Emergency Room access or hospitalizations, compared to ASL data. Similarly, the number of institutionalized patients should decrease by 20% relative to ASL data. Furthermore, the program seeks to reduce the number of patients who fall by 20% compared to baseline levels (Table 3).

Follow-up success will be measured by a 90% response rate from patients, and more than 80% of patients should be taken into care. These indicators will be monitored annually to assess the effectiveness and impact of the PDTCP.

Table 3. Monitoring and evaluation indicators for PDTCP outcomes.

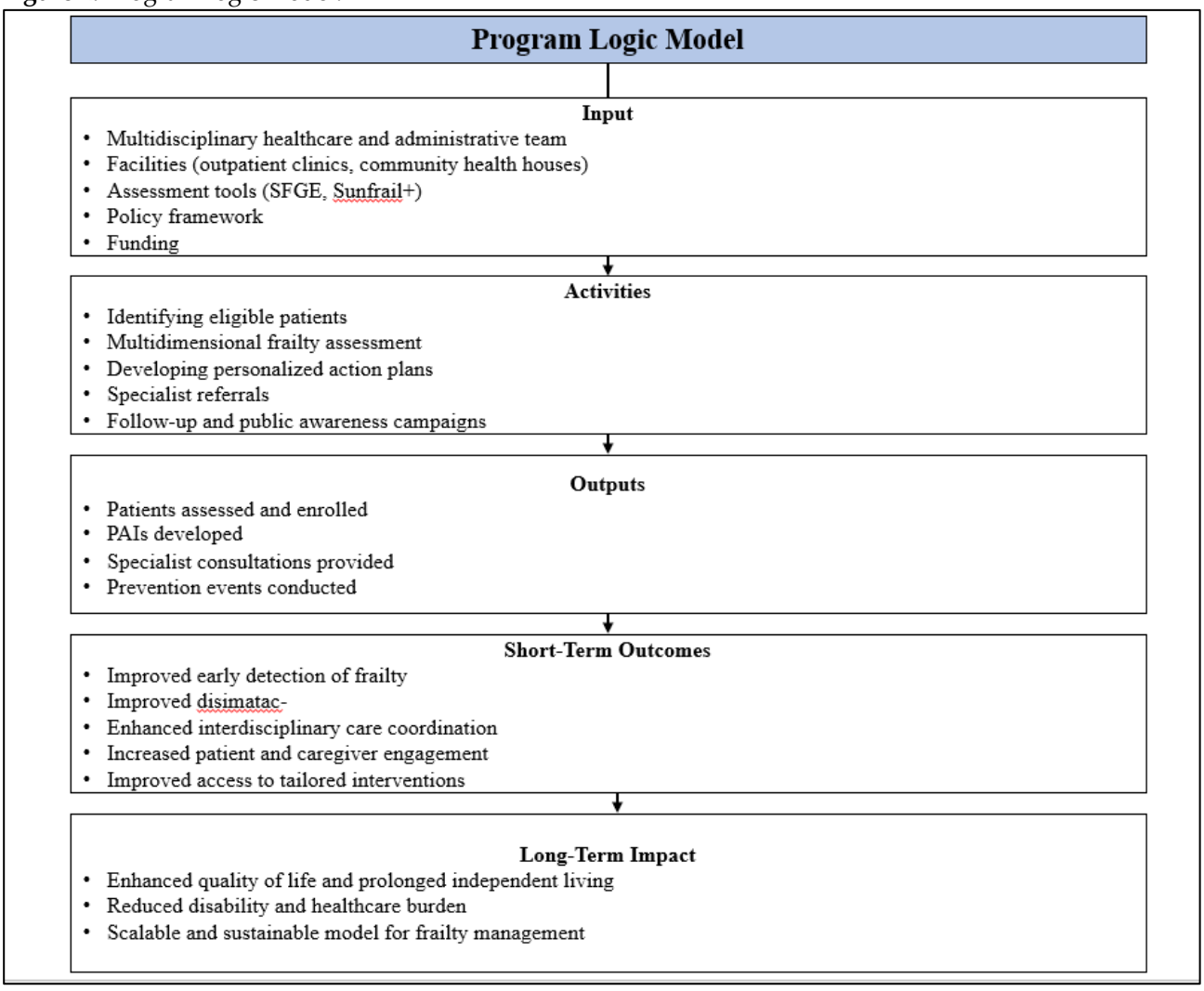
Indicators	Target	Frequency
No. of patients recruited into the PDTCP		Annual
PCP (Personalized Care Plan) drafting	90% of frail and pre-frail patients taken into care by the PDTCP	Annual
Specialist Visits Performed	20% of participating patients	Annual
No. of patients with Emergency Room access or hospitalizations	20% reduction compared to ASL data	Annual
No. of institutionalized patients	20% reduction compared to ASL data	Annual
No. of patients who fell	20% reduction compared to baseline	Annual
No. of patients who respond to follow-up	90%	Annual
No. of patients taken into care	>80%	Annual

Program logic model

The Program Logic Model (Figure 2) for the PDTCP outlines a structured, step-by-step framework designed to manage biopsychosocial frailty in older adults. It begins by mobilizing key inputs, such as trained personnel, clinical infrastructure, assessment tools, policy support, and

funding to deliver targeted activities like patient screening, multidimensional assessments, individualized care planning, specialist referrals, and public outreach. These activities produce measurable outputs including patient enrolments, care plans, and clinical interventions. In the short term, the model seeks to enhance early frailty detection, improve care coordination, and expand access to tailored services. Ultimately, the long-term impact aims to improve quality of life, delay disability, and establish a sustainable, integrated care model that reduces the healthcare burden associated with aging populations.

Figure 2. Program logic model.



DISCUSSION AND CONCLUSIONS

The Prevention and Diagnostic Therapeutic Care Pathway (PDTCP) represents a structured and forward-looking approach to address the complex and growing challenge of biopsychosocial frailty among community-dwelling older adults. By integrating validated multidimensional assessment tools with a person-centered care model and a clear governance framework, the PDTCP aligns with recent international recommendations on chronic disease management, healthy aging, and integrated health and social care systems [27].

A key strength of the model lies in the use of instruments such as the Short Functional Geriatric Evaluation (SFGE) and the Sunfrail+ questionnaire, which together provide a practical strategy for early identification and risk stratification in older, non-institutionalized populations [23-26]. Moreover, the proactive, multidisciplinary structure of the PDTCP promotes synergy between healthcare and social services, fostering collaboration across all levels of care delivery. The design is

consistent with recent Italian legislative reforms (Ministerial Decree 77/2022 and Law 33/2023), which emphasize the need for community-based prevention strategies and personalized care planning [17-18].

Despite its conceptual strengths, the PDTCP currently remains at the planning stage, and no empirical validation has yet been conducted. This absence of field-based evidence limits the immediate generalizability and scalability of the model. Pilot studies and real-world implementations are needed to assess its feasibility, acceptability, clinical impact, and long-term sustainability. Without such data, the capacity of the model to improve outcomes for frail older adults remains hypothetical.

Another relevant limitation is the high context specificity of the model. Rooted in the structure and policies of the Italian healthcare system, the PDTCP may not be directly transferable to other countries without significant adaptation. Differences in governance models, health financing structures, and workforce availability could affect its applicability and effectiveness across diverse health systems [7-9].

Practical implementation challenges also merit attention. The success of the model depends on the availability and training of multidisciplinary teams, the presence of adequate infrastructure (such as dedicated outpatient clinics and data systems), and the ability to coordinate effectively among general practitioners, specialists, and social workers. In fragmented or resource-constrained settings, these requirements may pose significant barriers to adoption [28].

Importantly, the model currently lacks an economic evaluation. No data are presented on implementation costs, potential savings, or cost-effectiveness. This omission limits the ability of decision-makers and healthcare managers to assess the financial sustainability and return on investment of the proposed interventions. Future studies should incorporate economic modeling to address this critical gap [29].

Regarding innovation, it is worth noting that the PDTCP does not introduce radically new methodologies but rather consolidates existing best practices into a coherent framework. Its value lies in the integration and operationalization of evidence-based strategies, rather than in methodological novelty. To enhance its relevance and visibility on an international level, a comparative analysis with similar models implemented in other countries—such as the Kihon Checklist in Japan, Integrated Care Systems (ICS) in the United Kingdom, or Accountable Care Organizations (ACO) in the United States—could help delineate its strengths and inform potential areas for refinement [30-31].

In conclusion, the PDTCP offers a promising foundation for the reorganization of care for frail older adults through an integrated and preventive lens [32-43]. However, its successful translation into practice will require empirical validation, economic justification, and contextual adaptation. Future research should focus on pilot testing in diverse regional settings, collecting both quantitative and qualitative outcomes, and engaging stakeholders to ensure long-term feasibility, effectiveness, and acceptability.

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