

Health care model for people living in nursing homes based on integrated care

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Abstract

Purpose – Older people living in nursing homes have complex care needs and frequently need specialists' advice and support that can be challenging to deliver in a rural setting. The aim of this paper is to describe a model of integrated care in a rural area supported by a nurse case manager.

Design/methodology/approach – A real-world evidence study of people living in Ribes de Freser nursing home, was conducted between specific timeframes in 2019 and 2022, comparing the casemix and outcomes of a traditional care model with the integrated interdisciplinary model.

Findings – The integrated care model led to a significant reduction in transfers to the emergency department, hospitalisations, outpatient medical visits and a reduction in the number of medicines. In addition, the number of residents receiving end-of-life care at the nursing home showed a substantial increase.

Originality/value – This case study contributes valuable evidence supporting the implementation of an integrated model of nurse case manager support in nursing homes, particularly in the rural contexts, where access to specialist medical staff may be limited. The findings highlight the potential benefits of person-centred integrated care for older adults, addressing their complex needs and improving end-of-life care in nursing home settings.

Keywords Person-centred care, Older adults, Nursing homes, Frailty, Integrated care, Nurse care manager, Primary care, End-of-life, Geriatrician, Medication review

Paper type Research paper

Introduction

Population ageing and increasing longevity pose challenges for transforming systems to meet the new requirements of the population. Health systems worldwide are struggling to respond to the needs of older people, aiming to be agile enough to address the changes they may experience and promote positive trajectories of healthy ageing.

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This research was supported by the Department of Primary Care, Fundació Hospital de Campdevàno.

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Disclosure of interest: The authors declare that they have no conflicts of interest concerning this article.



By 2050, one in three Spaniards will be over 65 years old and more than 5.3 m citizens will be over 80 years old (Ministerio de la Presidencia, 2021), according to the United Nations (UN) World Population Prospects report. With ageing, the need for health care increases, leading to higher consumption of health and social resources (Hendry *et al.*, 2018; Hull *et al.*, 2018). Therefore, organizing and adequately dimensioning care services become crucial in response to the increased demand from this population group. Among older individuals, some will be in good health, while others will have multimorbidity and chronic health problems, necessitating increased healthcare and, in some cases, institutionalization (British Geriatrics Society, 2023; Stafford *et al.*, 2018).

Nursing homes are common settings for older adults during the latter part of their lives, facing increased challenges due to diverse populations with complex and life-limiting conditions (Bökberg *et al.*, 2019). These conditions require interdisciplinary healthcare to provide an appropriate response to their needs, with a focus on quality and value for both the individual and their family.

Given the heterogeneity of the ageing population (Mitnitski *et al.*, 2016), care for this group of people must be individualized to meet the specific needs of each resident. The person-centred care (PCC) model has gained popularity in recent years.

The concept of PCC is complex and multidimensional, depending on the care setting (Wang, 2021). PCC prioritizes the quality of life for older people in need of care, placing the person at the centre of care planning. This model is based on professionalism and technical knowledge, considering the individual's needs, rights, preferences and wishes in care and daily life.

To implement a comprehensive approach with the person, a situational diagnosis is necessary to identify the needs that must be addressed. In this regard, the parameter of frailty, defined as a biologic syndrome of decreased reserve and resistance to stressors, resulting from cumulative declines across multiple physiologic systems and causing vulnerability to adverse outcomes (Fried *et al.*, 2001), proves valuable in discerning the great heterogeneity of population ageing.

After identifying needs and establishing therapeutic goals, the next step is to develop an individualized care plan. Most institutionalized residents are in their last two years of life, with over three-quarters of them experiencing some degree of cognitive impairment (British Geriatrics Society, 2021). Therefore, providing care for these individuals requires a multidisciplinary approach by an expert team.

To deliver this type of care, comprehensive reforms are necessary to ensure appropriate care for older individuals in all aspects: mental, social and health. The use of the Comprehensive Geriatric Assessment (CGA) and the Frail-VIG index (Amblàs-Novellas *et al.*, 2018) allows for situational diagnosis and the collaboration of a multidisciplinary team, including liaison nurses, primary care nurses, primary care physicians and geriatricians, to identify people living with frailty and complex needs as well as apply valuable practices such as person-centred medication review and advanced decision planning.

Residential aged-care facilities are embracing a new paradigm for care, making PCC the guiding standard of practice (Brownie and Nancarrow, 2013). Person-centred integrated care is a challenge for the care model in nursing homes, and though there is no consensus on the best method, all approaches are associated with positive influences on care.

The aim of our study is to propose an integrated care model in a rural area, involving primary care, nursing home care and geriatric specialists, to improve the outcomes of care for institutionalized residents.

Materials and methods

Study design and subjects

The project is situated in the Catalan region of “*El Ripollès*”. The Campdevàrol Hospital serves a dispersed rural population of over 25,000 people residing in a territory of

956.2 km². This region exhibits a significant ageing population; in the last population cut-off in 2021, 24.48% of the population was over 65 years old and 4.85% was over 84 years old. Given the high percentage of ageing residents, strategies to improve their care become imperative.

Consequently, a few years ago, a process of vertical integration began between primary care and hospital care for patients with complex and frailty conditions. Additionally, *Ripolles* was chosen as a pilot area for social and healthcare integration in recent months. It has two main providers responsible for five primary care centres, one referral hospital and five nursing homes.

The Geriatric Service offers specialized assessment and treatment in an acute geriatric unit, palliative and intermediate care beds, outpatient clinics, specialized domiciliary care and ambulatory care.

The team comprises four geriatricians, and regular meetings are held with the geriatrician, a family doctor, a nurse case manager and a primary care nurse in each area. This allows for continuity of care between inpatient and outpatient settings while jointly developing individualized intervention plans.

The Ribes de Freser Nursing Home, located in the centre of the Ribes municipality, is home to 50 residents. The staff includes one registered nurse, ten part-time auxiliaries, three geriatric assistants, one physiotherapist and an occupational therapist. Our integrated care model included that the nurse case manager, the geriatrician and the primary care doctor that dedicate a few hours per week to implement the PCC, which means that these three people are part of the regular team of the nursing home.

This is a real-world evidence study between two models of care conducted in a rural area nursing home. All residents of the nursing home were included in the study, except those who had been living in the facility for less than six months at the time of data collection.

Figure 1 shows an overview of the study. We compared the traditional care model (which is the one that was in operation in 2019) and the integrated care model by a nurse case manager (which is the one that was on operation in 2022).

Traditional care model

The traditional care model, which is the one that was already in operation in 2019, involved the assessment of eventualities by a primary care doctor and a nursing home nurse. The nursing home nurse usually requests medical assessment on-demand; however, there is no established procedure for individualised intervention plans. However, this model faced significant difficulties due to the pressure of care, insufficient time and coordination between several care levels (Burgos-Díez *et al.*, 2020).

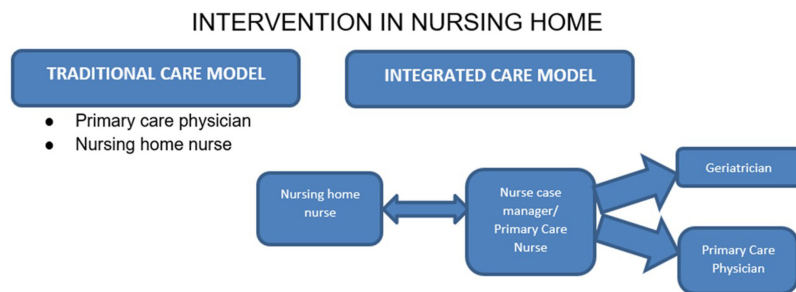


Figure 1. Differences between traditional care model and integrated care model in the nursing home

The integrated care model

The integrated care model, which is the one that was in operation in 2022 (with data collection in the period 2020–2021 are not assessable due to the COVID-19 pandemic), consists of a multidisciplinary assessment coordinated through a nurse case manager and a nursing home nurse (Sadler *et al.*, 2023).

This model facilitates the assessment of residents according to their needs and complexity, with the primary care physician and/or geriatrician making decisions about the need for assessment. Proactive work is carried out with the residents and a joint assessment is conducted between the residence nurse, the nurse case manager and the geriatrician to propose an intervention plan that is subsequently agreed upon with the resident and/or family. Issues discussed at this meeting include crisis management, the need for follow-up by other specialists, a comprehensive medication review, and a review of the user's end-of-life care preferences. Data information from clinical meetings is included in the resident's medical record by standardized form. The resident comprehensive review is revisited annually.

Multidisciplinary team tasks

The community nurse case manager is an advanced practice nurse responsible for coordinating the tasks of the multidisciplinary team, assessing and coordinating the care of residents with complex needs, facilitating communication between the multidisciplinary team and the resident and/or family and identifying complexity in.

The geriatrician leads the comprehensive geriatric assessment, helps to set the therapeutic goals for the residents, and actively participates in the medication review. In the event of a crisis requiring hospital admission, the geriatrician oversees the resident's care during hospitalisation.

The nursing home nurse dedicates all their working hours to the care of the residents, is therefore the person who knows the residents best, and is the professional who carries out the early detection of possible crises, allowing proactive action to be taken.

The primary care physician intervention in the integrated care model application consists in monitoring the residents' chronic pathologies.

When a new resident is admitted, a coordination is carried out between the nurse in the residence and the nurse case manager and a personalized care plan is drawn up. Once the resident is adapted to their new home, the nurse case manager coordinates the multidisciplinary team to carry out a comprehensive geriatric assessment (CGA) that allows a personalized care plan to be drawn up and is responsible for agreeing it with the resident and/or the family.

In case of crisis, an initial assessment is carried out by the nursing home nurse is discussed with the nurse case manager to determine the need for a further assessment or review by the primary care physician and/or the geriatrician according to the resident's needs. If this care cannot be carried out on a scheduled basis, the primary care doctor will carry out the first assessment and decide on the best place to attend to the resident.

Outcome measures

The situational diagnosis of residents is made through CGA and residents' frailty is calculated using the Frail-VIG index (Amblàs-Novellas *et al.*, 2018). Frail-VIG index consists of 25 items including the assessment of residents' functionality, cognition, social status, geriatric syndromes and comorbidities. Residents are categorized into four groups based on their Frail-VIG index score: 0–0.19 (not frail), 0.20–0.35 (mildly frail), 0.36–0.49 (moderately frail) and >0.50 (severely frail).

The data collected contains the following parameters. For some parameters we only have information from 2022, as they were not collected under the traditional care model and have been added as they better define the resident sample.

- (1) Sociodemographic data: age and gender.
- (2) Functional data: daily living activities, quantified with the Barthel index (Sainsbury *et al.*, 2005).
- (3) Cognitive assessment: using the Global Deterioration Scale – Functional Assessment Staging (GDS-FAST) for Alzheimer’s disease or the Clinical Dementia Rating Scale for other dementias (Reisberg *et al.*, 1982).
- (4) Pharmacological data: prevalence of polypharmacy (≥ 5 drugs) (Gnjidic *et al.*, 2012). Medication review was performed based on the person-centred prescribing (PCP) model for the detection of inappropriate prescriptions (IP). The PCP model stratifies patients according to their therapeutic objective (survival, maintenance of functionality and symptomatic control) and proposes a medication review adjusted to that objective. Medication review considers prevalent chronic pathologies, evidence-based guidelines and recommendations issued by scientific societies (Molist-Brunet *et al.*, 2015, 2021a, b, 2022a, b; Espauella-Ferrer *et al.*, 2023).
- (5) Complexity identification: chronic complex patients (CCPs) were defined as individuals in situations that reflect the challenge of their management, care needs and the requirement for specific individual plans due to concurrent illnesses, use of healthcare services and context, according to the criteria of the Catalan Department of Health (Santaeugènia *et al.*, 2021). Identification of patients at the end of life (EOL patients): using the criteria of the NECPAL CCOMS-ICO© tool (Gómez-Batiste *et al.*, 2013, 2014). These criteria identify patients with high risk to be in the last months or year of life. The eligibility criteria used to identify them as EOL subjects: a) identification as such by their primary care physician, b) advanced disease criteria or c) Frail-VIG index >0.50 (Amblàs-Novellas *et al.*, 2018).
- (6) Health service delivery: the number of health interventions received by all residents (medical visits and emergency room referrals) during the two-year follow-up.
- (7) Place of death: registration of end-of-life care location.

Ethical considerations. All clinical procedures involved in this study were in accordance with the institutional guidelines. Researchers undertook to protect resident privacy and the procedures in this study were in accordance with the Declaration of Helsinki.

Statistical analysis. IBM SPSS Statistics 28.0 was used for the statistical analysis. Frequencies and percentages were calculated for qualitative variables, while means and standard deviations were calculated for quantitative variables. Differences between the two stages (traditional model and integrated model) and qualitative variables were analysed using the chi-square test (or Fisher’s exact test in 2×2 tables where expected frequencies were less than 5). Student’s *t*-test was used to analyse differences between the two stages and quantitative variables. Student’s *t*-test for paired data was used to assess differences between drugs at pre-medication review and post-medication review (integration model). The level of statistical significance used was 5% bilateral.

Results

Study population characteristics

During the study period, the nursing home population remained constant based on bed availability. In 2019, the nursing home had 45 beds, and 46 residents were included in the study. In 2022, the number of beds increased to 50, and 53 residents were included.

Table 1 describes the characteristics of the residents in both 2019 and 2022. The socio-demographic, cognitive and functional characteristics did not differ significantly between the two periods ($p \geq 0.05$). Both cut-offs had a wide age range, with an average age of over 85 years. The majority of the residents were women, and, on average, they were moderately dependent. The diagnosis of dementia varies slightly between the two cohorts (traditional care model (2019) and integrate care model (2022)), in the traditional care model was 47.83% ($n = 22$) of residents diagnosed with dementia and in the integrated care model the presence of dementia has decreased, being 33.97% ($n = 18$), although there was no statistical difference ($p = 0.435$).

Assessment of frailty and situational diagnosis

Applying the integrated model, we obtained more information from the residents. The presence of frailty was assessed using the Frail-VIG index, with a mean score of 0.40 ± 0.17 . Categorically, 9.43% ($n = 5$) of the residents were classified as non-frail, 22.64% ($n = 12$) as mildly frail, 41.51% ($n = 22$) as moderately frail and 26.42% ($n = 14$) as severely frailty. All residents treated with the integrative care model who died during the intervention had a frailty grade ≥ 0.48 , except for one resident who did not meet frailty criteria.

Through the assessment of frailty, along with a CGA, a situational diagnosis was made, identifying 66.03% ($n = 35$) of the residents as CCPs and 26.42% ($n = 14$) as EOL residents.

Medication review results

Following the situational diagnosis and therapeutic objective establishment, a medication review based on the PCP model was carried out (**Table 2**). A statistically significant decrease in the median number of medications was observed between pre-medication and post-medication review, 7.15 ± 3.02 medicines and 5.88 ± 2.37 ($p < 0.001$), respectively. Based on the PCP model, 64.15% ($n = 34$) of the residents had medication withdrawn, 18.87% ($n = 10$) maintained the same number of drugs and 16.98% ($n = 9$) had an increased number of prescribed drugs.

Baseline data	Total N = 46 (2019)	Total N = 53 (2022)	p Value
<i>Demographic data</i>			
Age, mean (SD)	85.15 (6.47)	86.03 (7.09)	0.539
Gender, N (%)			0.690
Men	12 (26.10%)	12 (24%)	
Women	34 (73.9%)	38 (76%)	
<i>Clinical, functional and cognitive data</i>			
Barthel index (BI), mean (SD)	55.22 (29.55)	53.49 (31.58)	0.780
Barthel index			0.833
Independence: BI ≥ 95	7 (15.21%)	5 (9.43%)	
Mild dependence: BI 90–65	15 (32.61%)	17 (32.08%)	
Moderate dependence: BI 60–25	15 (32.61%)	19 (35.85%)	
Severe dependence: BI ≤ 20	9 (19.56%)	12 (22.64%)	
Cognitive status			0.435
No dementia	24 (52.17%)	35 (66.03%)	
Mild dementia	5 (8.33%)	1 (1.89%)	
Moderate dementia (from GDS 5 to GDS 6B)	8 (17.39%)	7 (13.21%)	
Advanced dementia (from GDS 6C)	9 (19.56%)	10 (18.87%)	

Source(s): Authors' own word

Table 1.
Describes the characteristics of the residents (2019 and 2022)

Comparison of resource consumption

The comparison of resource consumption between the traditional care model and the integrated care model is shown in [Table 3](#).

With the integrated care model, the number of referrals to the emergency department (ED) due to falls increased and a higher proportion of cases presented fractures compared to the traditional model. However, the number of residents requiring outpatient care decreased significantly in terms of ED referrals, admissions and outpatient care ($p < 0.05$). Particularly noteworthy is the decrease in the number of ED visits for medical specialties.

End-of-life care

End-of-life care in a hospital setting occurred in 100% of residents enrolled in the traditional care model, whereas only 20% (n = 2) of individuals under the integrated care model received

Table 2.
Pharmacological results of the medication review (2022)

	Pre- medication review	Post-meditation review	<i>p</i> Value
Polypharmacy, mean (SD)	7.15 (3.02)	5.88 (2.37)	<0.001
Polypharmacy, degree			
0–4 medications	9 (16.98%)	11 (20.75%)	
5–9 medications	34 (64.15%)	38 (71.70%)	
10 or more medications	10 (18.87%)	4 (7.55%)	

Source(s): Authors' own word

Table 3.
Comparison of resource consumption between the traditional model and the integrated model

Resource consumption	Total N = 46 (2019)	Total N = 53 (2022)	<i>p</i> Value
<i>Emergency visits</i>			
Total number of users consulting the emergency department (ED)	26 (56.52%)	16 (30.18%)	0.008
Number of referrals to emergency services	34	19	
Reason for ED referral			
Falls	7 (20.58%)	10 (52.63%)	
Chronic pathology decompensation	21 (61.76%)	5 (26.31%)	
Other	6 (17.64%)	4 (21.05%)	
<i>Hospital admissions</i>			
Total hospital admissions	21	8	0.007
Absolute number of days of admission	186	81	
<i>Outpatient care</i>			
Total users requiring outpatient care	24 (52.17%)	10 (18.86%)	<0.001
Total visits medical specialties	34	9	
Medical specialties			
Geriatrics	9 (26.47%)	2 (22.22%)	
Pneumology	2 (5.88%)	1 (1.11%)	
Cardiology	5 (14.70%)	0 (0%)	
Internal medicine	8 (23.52%)	0 (0%)	
Neurology	6 (17.64%)	4 (44.44%)	
Onco-haematology	4 (11.76%)	2 (22.22%)	
Total visits to surgical specialties	11	10	
Surgical specialties			
Traumatology	4 (36.36%)	8 (80%)	
Other	7 (63.63%)	2 (20%)	

Source(s): Authors' own word

end-of-life care in a hospital setting. The majority of deaths (80%, $n = 8$) occurred in the nursing home in the cohort of integrated care model.

Discussion

This open prospective real-world evidence study from two models of care shows the potential for changing the health outcomes of people living in nursing homes through organizational changes. The discussion includes the organizational changes between both care models and the respective residents' results.

The project develops an integrated care model that involves collaboration between members of the nursing home, primary care and specialized geriatric care. The application of the integrated care model has led to significant changes compared to the traditional care model. The key factors driving these changes include a more proactive and PCC approach, as well as improved coordination between primary and specialized care. In contrast, the traditional model relies more on the professionals within the nursing home and has a reactive approach to crises ([British Geriatrics Society, 2021](#)).

The central role of nurses in residential care is confirmed by this integrated care model, which emphasizes a balanced hierarchy among the participants. Several factors contributed to this change, including the characteristics of the professionals involved and the willingness of the organizations. Contextual elements, such as the experience of the COVID-19 pandemic, which brought specialized care closer to nursing homes and generated positive outcomes, also played a role. Additionally, the relationship model established at the territorial level between the geriatric service and primary care proved favourable.

Regarding the scalability of the integrated care model, it is crucial to consider the heterogeneity among different nursing homes, which may result in variable organizational models. Factors such as the size of the nursing homes, staff characteristics, residents' annual mortality, relationship between nursing homes and the health system and work culture will influence the design of each nursing home's multidisciplinary health care team. However, the classification of patients according to the degree of frailty facilitates universal health care organization ([British Geriatrics Society, 2023](#)).

At the care model level, the most significant change introduced was the systematic implementation of a CGA, including needs assessment, development of a patient-centred therapeutic plan based on their values and preferences and periodic reviews of the plan ([Chadborn et al., 2019](#)). At the team coordination level, the role of the primary care nurse manager was crucial in facilitating access to all primary care resources and using specialized care resources through the geriatrician.

The personalization of treatment plans focused on the intensity of crisis intervention, medication review and advanced planning, resulting in changes in outcomes. The application of the person-centred prescribing model as a medication review tool led to reductions in excessive polypharmacy, and we will also achieve reductions in the average number of medications per resident, showing similar results to those recently demonstrated ([Molist-Brunet et al., 2022a](#)). Although we have not performed a cost analysis, recent publications have shown a reduction in pharmacy costs using the PCP model ([Molist-Brunet et al., 2021a, b](#)).

The identification of individuals with severely frailty as a possible end-of-life indicator and the implementation of advanced planning played a key role in increasing end-of-life care within the nursing home. The willingness of nursing home staff to provide end-of-life care within the facility and the support from healthcare teams were essential elements ([Alcorn et al., 2020](#); [Mota-Romero et al., 2021](#)).

The personalization of interventions, along with shared work between nursing homes and healthcare teams, contributed to the reduction in the number of referrals. The literature

considers changes in acute hospital referrals as a good indicator to assess the quality of care in nursing homes (Sherlaw-Johnson *et al.*, 2016). Emergency department referrals from nursing homes depend on early identification of changes in residents, existence of prior planning and support received by the nursing home in managing sick individuals during crises (Hodge *et al.*, 2021). Previous epidemiological studies show that 30–60% of residents in residential care homes visit the ED during one-year period. The figures from our study are in concordance with other published studies but highlight a decrease in ED referrals after implementation of the integrated care model (Alfonso-Argilés *et al.*, 2022; Brucksch *et al.*, 2018).

While there is no clear consensus on the best model of nursing home care, there is agreement on interventions that can improve outcomes, such as staff training and promoting collaboration between health care and nursing home care through integrated models. Expert involvement in advanced frailty care has also been proven effective (Berkhout *et al.*, 2003). Previous studies propose using outcomes such as indicators related to medication, out-of-hours care, emergency department use, hospital admissions and the experience of residents and family to assess how a model of care is working, these proposed outcomes are similar to those used in our study (Berkhout *et al.*, 2003).

Research has been gradually acquiring importance in care homes, and improving care for residents is a priority. In this sense, we have made contributions in this area in the relationship between care homes and health services, with PCC and end-of-life care (Goodman *et al.*, 2016; Shepherd *et al.*, 2017).

The integrated care model demonstrated better outcomes. Surprisingly, however, we obtained higher falls in residents attended with this care model. This is most likely because the nursing home was currently an unrestricted facility (2022), whereas before it was not (2019). Recently, the nursing home has incorporated a new care philosophy that prioritises the encouragement of resident mobility, which, despite institutional efforts to minimise fall risk, can increase the risk of falls.

This study has been carried out in a rural area with a high level of ageing and a significant concentration of multimorbidity. These population characteristics data are often observed in other rural areas as shown by the literature (Rygh and Hjortdahl, 2007). A challenge for rural nursing homes is the difficulty in accessing the specialised hospital environment. This has led to the creation of various telemedicine strategies to facilitate the care of these residents (May *et al.*, 2021). In our environment, the availability of a community hospital with an important development of geriatric care has allowed us to solve this difficulty. Due to the profile of the patients treated, it is rarely necessary to refer residents to higher level hospitals. Our study has some limitations. The data obtained from the traditional care model were collected retrospectively, whereas the data from the integrated care model were collected prospectively, which may lead to an information bias. In addition, the study has only been conducted in a single residence where the number of participants is limited. A limitation in the evaluation of outcomes is the lack of a formal assessment of the resident/caregiver experience.

The health care model presented in this study is based on clinical integration, utilizing geriatric assessment and classifying residents according to frailty levels, resulting in improvements in most health indicators in nursing home care. As a recent Cochrane review has shown, it is necessary to continue research in this direction. In our case, the scalability of this model to other nursing homes requires further exploration.

Conclusion

The findings of this study strongly advocate for the implementation of an integrated care model facilitated by a community nurse case manager in nursing homes. This model proves to be an effective approach in tailoring advance planning based the specific wishes of residents and their families, while also enabling proactive crisis care management to prevent

potential deteriorations and prioritize home-based care, thereby reducing the need for acute hospitalization whenever feasible.

Further research in this area holds a great promise and could open up new avenues for developing multiple integration models within nursing home settings.

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