



Caregiver Training Models for Safe Home-Based Recovery

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Abstract

The transition from hospital-based treatment to recovery at home frequently transfers substantial responsibility from professional health-care teams to patients and informal family caregivers. Caregivers may suddenly be expected to support medication routines, mobility and transfers, nutrition, personal care, rehabilitation exercises, symptom monitoring, appointment coordination, home-safety modifications, and recognition of warning signs despite receiving limited opportunity to demonstrate practical competence before discharge. The present study develops a simulation-based model of structured caregiver training for safer home recovery. A hypothetical sample of 400 patient–caregiver dyads was divided equally between a structured competency-based training pathway and conventional discharge education. The proposed intervention combines individualized needs assessment, practical demonstration, caregiver return-demonstration, teach-back, medication-safety instruction, mobility and transfer training, home-risk preparation, written escalation guidance, and early post-discharge follow-up. Because no original clinical dataset was supplied, all numerical findings are synthetic and intended exclusively for methodological illustration.

Simulated caregiver competency increased substantially across medication support, transfer and mobility, warning-sign recognition, home-safety management, and overall recovery-plan confidence. At four weeks, 78% of caregivers in the structured pathway were modeled as completing the major recovery tasks safely compared with 55% receiving conventional education, while potentially preventable home-care errors were modeled at 13% and 27%, respectively. Previous trials and systematic reviews demonstrate that caregiver involvement in care transitions, rehabilitation, and discharge planning can improve selected patient, caregiver, and service outcomes, although intervention effects are not uniform across populations or outcomes. The study concludes that caregiver preparation should be treated as competency development rather than information transfer alone, with training tailored to the patient's actual post-discharge needs and supported by clear professional escalation pathways.

Keywords: caregiver training; home-based recovery; discharge planning; care transitions; family caregivers; patient safety; rehabilitation; medication safety; teach-back; transitional care

1. Introduction

Discharge from hospital represents a critical transition in which responsibility for daily care frequently shifts from continuously available professional teams to patients and family members. The home



environment may provide comfort and continuity, but it also lacks many of the safeguards present in hospitals, including immediate professional observation, standardized equipment, rapid diagnostic assessment, and continuously available nursing assistance. Transitional-care research has consequently emphasized preparation, continuity, communication, and early follow-up as important components of safer discharge. Naylor and colleagues demonstrated that comprehensive discharge planning combined with home follow-up could reduce rehospitalization among at-risk older patients, while Coleman and colleagues found lower rehospitalization following a care-transition intervention that actively involved patients and caregivers in managing continuity across settings.

Informal caregivers often become central to home recovery despite considerable variation in previous health knowledge, physical ability, health literacy, confidence, available time, and emotional preparedness. Their responsibilities may include organizing medicines, supervising mobility, assisting transfers, encouraging prescribed exercise, monitoring food and fluid intake, supporting personal care, identifying deterioration, and communicating with health professionals. WHO's integrated-care approach recognizes that carers require information, skills, and practical tools when supporting care-dependent older people in community settings. The implication is that safe discharge requires more than giving a caregiver a written sheet shortly before the patient leaves hospital.

Evidence from rehabilitation illustrates the potential value of structured caregiver education. Kalra and colleagues reported that caregiver training delivered during stroke rehabilitation reduced caregiver burden and costs while producing favorable psychosocial outcomes, although later multicenter research using the London Stroke Carers Training Course did not reproduce all earlier advantages. This contrast is academically important because it demonstrates that caregiver training cannot be assumed to work simply because a program is labeled structured. Intervention content, staff preparation, delivery fidelity, patient characteristics, caregiver readiness, and health-system context may all influence outcomes.

Caregiver preparation also intersects directly with medication safety and discharge understanding. Wagle and colleagues' systematic review identified medication-related challenges faced by caregivers of vulnerable older people and evaluated interventions intended to improve medication safety. Teach-back research likewise indicates that asking learners to explain health information in their own words can improve understanding and self-management in some settings, while evidence remains heterogeneous across outcomes. These findings support training methods that verify comprehension rather than assuming that information has been understood because it was delivered.

The present study therefore proposes a competency-based caregiver training model for safe home-based recovery. Training is organized around the specific tasks expected after discharge and includes demonstration, return-demonstration, teach-back, written guidance, home-safety planning, and structured follow-up. Because no real patient or caregiver dataset was provided, the analytical component uses transparent simulated data. The resulting estimates are not clinical effectiveness claims but a model showing how caregiver preparation could be evaluated in a future prospective trial or implementation study.



2. Objectives of the Study

2.1 To Strengthen Practical Caregiver Competency Before Home Recovery

The first objective is to determine whether caregiver preparation can be improved by shifting from predominantly verbal discharge instruction toward observable task competency. A caregiver responsible for helping an individual transfer from bed to chair, organize medications, supervise prescribed exercise, or recognize clinical deterioration requires different practical capabilities from one whose principal role is meal preparation or appointment coordination. Training should therefore be matched to actual responsibilities rather than delivered as a universal package.

A competency-based approach requires the caregiver to demonstrate key skills wherever appropriate. Instruction may include safe positioning, transfer sequence, appropriate use of mobility aids, medication organization, recovery-plan scheduling, and recognition of selected warning signs. Earlier stroke-caregiver training research supports the feasibility of teaching handling and care skills during rehabilitation, while systematic evidence indicates that caregiver interventions frequently combine education, skills training, home visits, or telephone support.

2.2 To Improve Safety, Recognition of Deterioration, and Referral Continuity

The second objective is to develop caregiver capacity to distinguish expected recovery experiences from situations requiring professional review. Caregivers should not be expected to diagnose complications independently. Instead, they require clear instructions regarding which symptoms can be managed according to an established home-care plan, which changes require non-urgent professional contact, and which warning signs demand urgent or emergency assessment.

This objective reflects the broader care-transition principle that patients and caregivers need understandable guidance and continuity across settings. Coleman and colleagues' transition intervention emphasized active participation, cross-setting communication, and coaching, while caregiver integration into discharge planning has been associated with reduced readmission risk among older adults discharged to community settings. Caregiver training is therefore conceptualized as part of an integrated professional pathway rather than as transfer of responsibility away from the health system.

2.3 To Reduce Avoidable Caregiver Burden Through Role Clarity and Support

The third objective is to ensure that caregiver training does not unintentionally expand responsibility beyond reasonable limits. Greater knowledge may improve confidence, but caregivers can still experience physical, emotional, financial, and social burden. Systematic evidence evaluating caregiver interventions after hospital discharge found potential benefits for caregiver burden and anxiety, but did not demonstrate consistent improvements across every patient and caregiver outcome.

Accordingly, the proposed model incorporates role boundaries, access to professional support, and identification of tasks requiring formal nursing, rehabilitation, or medical services. Caregiver involvement should enable safer recovery without assuming that family members can substitute for trained professionals. WHO guidance similarly places caregiver support within a broader integrated-care system rather than treating unpaid family care as an isolated solution to service limitations.



3. Review of Literature

3.1 Caregiver Participation During Discharge and Transitional Care

Naylor and colleagues' randomized clinical trial of comprehensive discharge planning and home follow-up among hospitalized older adults demonstrated that a structured transitional-care model implemented by advanced practice nurses reduced readmissions and extended the time to subsequent readmission. Although this intervention was not exclusively a caregiver-training program, it established an important principle: safe transition requires continuity beyond the moment of discharge.

Coleman and colleagues subsequently evaluated a care-transition intervention involving older adults and caregivers and reported lower rehospitalization rates at selected follow-up points. The intervention included tools for cross-setting communication, active participation in care, and guidance from a transition coach. These findings support the present study's inclusion of follow-up contact and caregiver navigation rather than ending training when the patient leaves the institution.

Rodakowski and colleagues' 2017 meta-analysis more directly examined caregiver integration into discharge planning for older adults. The analysis found caregiver-integrated discharge planning to be associated with approximately 25% lower relative risk of readmission at 90 days compared with interventions without such integration. This provides particularly relevant support for involving caregivers before discharge, although differences among interventions mean that the effect should not be attributed to training alone.

3.2 Skills Training, Rehabilitation, and Caregiver-Mediated Recovery

Kalra and colleagues conducted a randomized trial of caregiver training during stroke rehabilitation and reported reductions in caregiver burden and costs along with favorable psychosocial effects. Their intervention demonstrated that caregivers could be taught practical skills during inpatient rehabilitation rather than receiving instruction only immediately before discharge.

The subsequent multicenter TRACS study evaluated a structured version of the London Stroke Carers Training Course across 36 stroke rehabilitation units. The intervention included caregiver training sessions, competency assessment, and post-discharge follow-up. The large trial did not reproduce all positive findings from the earlier single-center work, underscoring the importance of implementation fidelity, organizational context, and realistic expectations regarding generalized effect.

Evidence synthesized by Smith and colleagues in 2019 found that interventions for caregivers supporting adults after hospital discharge most often involved training or skills-based programs, sometimes combined with home visits or telephone follow-up. Benefits were reported for selected caregiver-burden and anxiety outcomes, but effects on patient function and several other outcomes were inconsistent and overall evidence quality was moderate to low. Van Dijk and colleagues' 2020 review similarly concluded that caregiver involvement may contribute to functional performance among older patients, while emphasizing heterogeneity across studies.

3.3 Medication Safety, Teach-Back, and Home-Risk Management

Medication management represents a major area of caregiver responsibility after discharge, particularly when the patient has multiple medicines, cognitive limitations, impaired vision, or changing treatment instructions. Wagle, Skopelja, and Campbell reviewed caregiver-focused interventions intended to



improve medication safety among vulnerable older people and identified a range of approaches designed to support caregivers in this role. Medication training should therefore include not merely a medicine list but clear purpose, timing, dose, administration precautions, storage, missed-dose procedures where clinically defined, and contact instructions for uncertainty.

Teach-back provides one method of verifying whether essential instructions have been understood. Dinh and colleagues' 2016 systematic review found generally favorable effects across several adherence and self-management outcomes, although studies could not be pooled into a single overall effect because of heterogeneity. The technique is relevant to caregiver training because the educator asks the caregiver to explain or demonstrate what they will do at home, thereby revealing misunderstandings before discharge.

Home recovery also requires attention to falls and mobility. Home-based exercise can reduce subsequent falls in selected high-risk older populations, and caregiver involvement has been examined as part of rehabilitation and mobility support. Caregiver education should nevertheless avoid excessive protection that unnecessarily restricts independence. Research on caregiver approaches to fall prevention has shown that some carers attempt to reduce fall risk by discouraging independent activity, demonstrating why training should balance safety with appropriate functional autonomy.

4. Research Methodology

4.1 Research Design and Simulated Study Population

The study adopts a simulation-based comparative design involving 400 hypothetical patient–caregiver dyads discharged from hospital to home. Two hundred dyads were assigned to a structured competency-based caregiver-training pathway and 200 to conventional discharge education. The model is designed to represent mixed medical, postoperative, geriatric, and rehabilitation-related recovery rather than one specific disease group.

Because no empirical dataset was supplied, all participant characteristics and numerical outcomes are synthetic. A future clinical study should recruit clearly defined patient populations, obtain informed consent, receive institutional ethics approval, and specify which clinical conditions are appropriate for home recovery. Patients requiring continuous skilled nursing, unstable medical management, or institutional rehabilitation should not be included simply to increase caregiver involvement.

Potential covariates in a real study would include patient age, diagnosis, functional dependency, cognitive status, number of medicines, mobility status, prior admissions, caregiver age, relationship to patient, previous caregiving experience, literacy, health literacy, physical capability, employment demands, and availability of additional family support.

4.2 Structured Competency-Based Training Protocol

Training begins with identification of the tasks the caregiver is actually expected to perform. The educator then demonstrates relevant procedures using the same equipment or medication-management system intended for use at home wherever feasible. The caregiver subsequently completes return-demonstration or teach-back, allowing errors to be corrected before discharge. Teach-back evidence supports verification of understanding rather than reliance on passive information delivery.

The intervention also includes a simple written home-recovery plan containing daily tasks, medication information, rehabilitation instructions, appointment dates, warning signs, and escalation contacts. Early follow-up is incorporated because care-transition studies suggest that continuity after discharge is an important component of safer recovery. Training does not authorize caregivers to change prescription medicines, independently progress rehabilitation beyond approved limits, or manage clinical deterioration outside defined professional guidance.

Table 1: Proposed Caregiver Training and Competency Assessment Framework

Domain / Code	Proposed training or assessment item	Training method	Competency indicator
Medication support	Identify each prescribed medication schedule and explain what to do if uncertainty occurs	Demonstration + teach-back	Correct explanation using current discharge list
Mobility and transfers	Perform assigned transfer or mobility assistance safely	Demonstration + return-demonstration	Correct sequence and appropriate use of equipment
Recovery activities	Support prescribed home exercise or functional activity	Supervised practice	Follows clinician-approved plan without unsafe modification
Warning signs	Identify symptoms requiring routine, urgent, or emergency contact	Scenario-based teach-back	Correct escalation response
Home safety	Identify environmental risks relevant to the patient's recovery	Guided home-safety checklist	Appropriate risk-reduction plan
Q1	"I feel confident assisting with the daily recovery activities assigned to me."	Proposed questionnaire	1–5 Likert scale
Q2	"I understand how the patient's medicines should be supported at home."	Proposed questionnaire	1–5 Likert scale
Q3	"I can recognize changes that require contacting a health professional."	Proposed questionnaire	1–5 Likert scale



Note: The questionnaire items are proposed and unvalidated. They have not been administered to real caregivers and would require expert review, pilot testing, cultural adaptation, and psychometric evaluation before empirical use.

4.3 Outcome Measures and Statistical Analysis

The primary outcome is caregiver competency across five domains: medication support, mobility and transfer safety, warning-sign recognition, home-safety management, and confidence in implementing the recovery plan. Competency should be assessed through demonstration or scenario-based evaluation where possible rather than self-confidence alone. Self-reported confidence is important but should be interpreted separately because confidence may not always correspond to correct performance.

Secondary outcomes include completion of planned recovery tasks, home-care errors, unplanned health contacts, patient falls, medication discrepancies, caregiver burden, caregiver anxiety, functional recovery, readmission, and patient or caregiver satisfaction. Previous evidence demonstrates that caregiver interventions may influence caregiver burden and anxiety even when functional outcomes do not consistently differ, reinforcing the need to evaluate both patient and caregiver endpoints.

For a real study, between-group categorical outcomes could be analyzed using chi-square or Fisher's exact tests. Continuous outcomes could be assessed using independent-sample procedures or regression models adjusted for baseline differences. Repeated assessments at discharge, two weeks, four weeks, and three months could be examined through mixed-effects models. Readmission or time-to-event outcomes may require survival analysis, while caregiver burden and anxiety should be evaluated using validated instruments.

5. Analysis

5.1 Simulated Caregiver Competency and Home-Recovery Safety

The synthetic analysis shows substantial differences in caregiver preparation. At discharge, 84% of caregivers completing structured training were modeled as meeting predefined competency criteria across all essential assigned tasks compared with 57% receiving conventional education. The difference was greatest for transfer and mobility assistance, warning-sign recognition, and medication support.

At four weeks, 78% of the structured-training group was modeled as continuing to perform major recovery tasks safely compared with 55% in the comparison pathway. Potentially preventable home-care errors were modeled at 13% and 27%, respectively. These values are entirely hypothetical and demonstrate the type of process outcomes that future empirical research should assess rather than predicting actual clinical effect.

Table 2: Simulated Outcomes of Structured Caregiver Training

Outcome indicator	Structured caregiver training (n = 200)	Conventional discharge education (n = 200)	Simulated difference
Competent across assigned tasks at discharge	84%	57%	+27 percentage points



Outcome indicator	Structured caregiver training (n = 200)	Conventional discharge education (n = 200)	Simulated difference
Medication-support competency	82%	58%	+24 points
Safe mobility/transfer competency	79%	52%	+27 points
Correct warning-sign recognition	86%	61%	+25 points
Safe home-recovery task performance at week 4	78%	55%	+23 points
Potentially preventable home-care errors	13%	27%	–14 points
Caregivers reporting high recovery-plan confidence	81%	59%	+22 points
Completed planned professional follow-up	88%	72%	+16 points

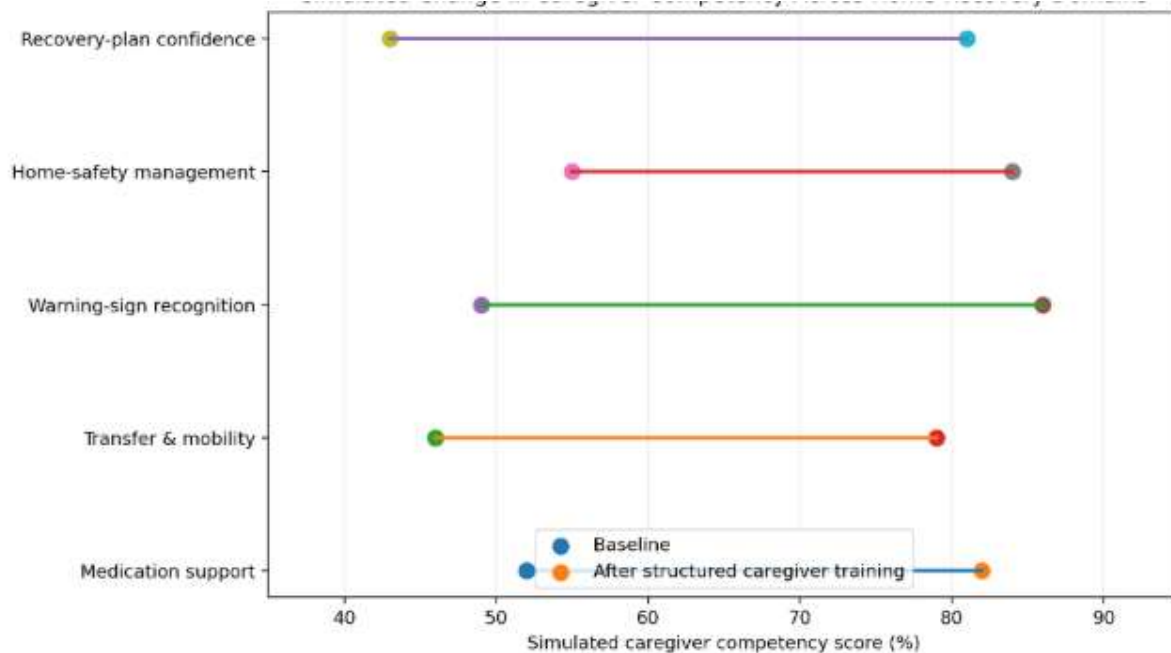
Note: All values are synthetic simulation data and are not derived from patients, caregivers, hospitals, or clinical records.

The simulated pattern is consistent with the hypothesis that practical verification can reduce the gap between hearing an instruction and performing it safely. This hypothesis is conceptually compatible with teach-back evidence and with previous caregiver-training studies, but it remains to be tested in the specific multi-condition model proposed here.

5.2 Change Across Core Caregiver Competency Domains

The simulated competency scores were also examined across five domains. Baseline values ranged from 43% for overall recovery-plan confidence to 55% for home-safety management. Following structured training, all five modeled domains exceeded 79%.

Graph 1: Simulated Change in Caregiver Competency Across Home-Recovery Domains



The largest modeled improvement occurred in warning-sign recognition, which increased from 49% to 86%. This domain is particularly important because caregivers should not be expected to diagnose complications but must know when professional assessment is required. A smaller but still substantial improvement was modeled for home-safety management, rising from 55% to 84%.

The graph also shows why caregiver preparation should be multidimensional. A caregiver may understand medication instructions but remain unable to support mobility safely, or may perform transfers appropriately while failing to recognize clinical deterioration. A single global confidence question would therefore provide insufficient evidence that the caregiver is prepared for home recovery.

5.3 Competency Retention and the Need for Post-Discharge Support

The simulation assumes some decline between discharge competency and four-week real-world performance. Even in the structured pathway, not every caregiver maintains ideal task performance. This reflects the possibility that home environments introduce barriers not fully visible during inpatient preparation, including fatigue, competing responsibilities, changes in patient function, equipment problems, or confusion when recovery does not proceed as expected.

This assumption is consistent with transitional-care research showing the importance of continuity after discharge. Naylor's model incorporated follow-up after hospitalization, while Coleman and colleagues used transition coaching across settings rather than relying exclusively on pre-discharge instruction. Caregiver training should consequently include a method for obtaining timely clarification once the patient is home.

The most defensible model is therefore training plus supported transition, not training alone. Telephone follow-up, home-health contact, rehabilitation review, teleconsultation, or appropriately



organized community care may be used depending on clinical need and available resources. The method can vary, but responsibility for escalation and follow-up should remain clearly defined.

6. Discussion

6.1 Caregiver Training as Competency Development Rather Than Information Transfer

The central implication of this study is that caregiver preparation should be evaluated according to what caregivers can safely perform, not simply according to whether education was documented. Traditional discharge processes may record that teaching occurred even when the learner's understanding or practical skill was not verified. A competency-based model requires observable confirmation wherever the home-care task has a physical or safety-critical component.

Teach-back strengthens this approach because it converts education from one-way information delivery into a process of verification. Dinh and colleagues found positive effects across several health-education outcomes, although heterogeneity prevented a single pooled estimate of effectiveness. The method should therefore be used as a communication strategy rather than treated as a guaranteed intervention effect.

Return-demonstration extends the same principle to physical tasks. Stroke-caregiver training developed by Kalra and colleagues included practical handling skills and competency preparation, while later TRACS implementation demonstrated both the feasibility and complexity of delivering structured caregiver education at scale. These experiences support practical competency testing while cautioning against assuming that standardization alone guarantees improved outcomes.

6.2 Balancing Patient Safety, Independence, and Caregiver Burden

Safe recovery should not be interpreted as maximizing caregiver control over the patient. Excessively protective behavior can unintentionally restrict mobility and independence. Research examining caregiver approaches to fall prevention has shown that some carers attempt to prevent falls by discouraging older adults from undertaking activities independently. Caregiver training should therefore explain when assistance is necessary and when supported independence is preferable.

The same principle applies to rehabilitation. Van Dijk and colleagues found evidence suggesting that caregiver involvement can contribute to functional performance, but the underlying studies were heterogeneous. Caregivers should facilitate professionally prescribed activity, not replace rehabilitation professionals or independently intensify treatment. This distinction protects patients from both underactivity and unsafe overexertion.

Caregiver burden must remain an explicit outcome. Smith and colleagues' meta-analysis found benefits for caregiver burden and anxiety in some intervention contexts but did not demonstrate consistent improvement across all patient outcomes. A high-quality program should therefore ask not only whether patients recover safely but also whether caregiver responsibilities remain feasible and supported.

6.3 Integrating Caregiver Training Into Hospital-to-Home Systems

Caregiver training will have limited value if it is treated as an isolated educational event rather than part of coordinated discharge planning. Rodakowski and colleagues' meta-analysis supports caregiver



integration into discharge planning, while Coleman and Naylor provide broader evidence that continuity and follow-up can improve transitional-care outcomes. These studies collectively reinforce the importance of preparing the caregiver before discharge and maintaining a connection after discharge.

Medication safety provides a clear example of why system integration matters. A caregiver may understand the discharge medication list, but later prescriptions, pharmacy substitutions, duplicated medicines, or conflicting advice can create new uncertainty. Wagle and colleagues' review demonstrates that medication-management challenges among vulnerable older adults frequently involve caregivers and therefore require targeted support. Training should teach caregivers how to identify uncertainty and whom to contact rather than expecting them to reconcile complex medication discrepancies independently.

The same principle applies to warning signs, mobility, nutrition, wound care, and rehabilitation. The caregiver's role is strengthened when responsibilities and escalation routes are explicit. A safe home-recovery system therefore requires a partnership in which hospitals prepare caregivers, community professionals provide continuity, and caregivers communicate observations without being expected to replace clinical judgment.

7. Conclusion

Caregiver training is an important component of safe home-based recovery because many post-discharge activities depend on family members who may have little prior health-care experience. Evidence from discharge planning, transitional care, stroke rehabilitation, medication safety, and caregiver-support research demonstrates that caregiver involvement can improve selected outcomes, although effects vary according to intervention design and population.

The present simulation proposes a competency-based model that combines individualized needs assessment, practical demonstration, return-demonstration, teach-back, home-safety preparation, medication support, warning-sign recognition, and early post-discharge follow-up. Under the synthetic assumptions, structured training produced higher modeled competency and lower rates of preventable home-care error than conventional discharge education. These numerical results are illustrative only and must not be interpreted as measured clinical effects.

The principal contribution of the proposed model is its distinction between education delivered and competency demonstrated. Discharge safety should not depend on the assumption that caregivers understood complex instructions during a stressful transition. Verification, role clarity, and follow-up provide a stronger basis for ensuring that caregivers can carry out only those tasks for which they have been appropriately prepared.

Future empirical research should evaluate this model across medical, surgical, geriatric, and rehabilitation populations using validated patient and caregiver outcomes. Studies should measure task competency, functional recovery, caregiver burden, medication discrepancies, falls, unplanned health contacts, readmission, patient independence, and implementation feasibility. Caregiver preparation should ultimately strengthen the hospital-to-home continuum while preserving appropriate professional responsibility and protecting both patient safety and caregiver well-being.



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