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Testing a Family-centered Intervention to Promote Functional and Cognitive Recovery in Hospitalized Older Adults

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Abstract

A comparative trial using repeated measures design evaluated the feasibility and outcomes of the Family-centered Function-focused Care (Fam-FFC) intervention intended to promote functional recovery in the hospitalized older adult. A three component intervention (1) environmental assessment/ modification, 2) staff education, 3) family/patient education and partnership in care planning with post-acute follow-up) was implemented by a family-centered resource nurse and a facility champion. Control units were exposed to function-focused care education only. Ninety-seven dyads of medical patients age 65 and older and family caregivers (FCGs) were recruited from three medical units of a community teaching hospital. The majority of patients were female (53%); white (89%), married (51%) or widowed (40%), with a mean age of 80.8 (\pm 7.5). The majority of FCGs were married (78%) daughters (34%), followed by female spouses/partners (31%), in the age range of 46–65 (38%). Outcomes for patients included: functional outcomes (ADL and walking performance, gait, balance), and delirium severity and duration. FCG outcomes included preparedness for caregiving, anxiety, depression, role strain, and mutuality. The intervention group demonstrated less severity and duration of delirium, and better ADL and walking performance, but not gait/balance as compared to the control group. FCG who participated in Fam-FFC showed a significant increase in preparedness for caregiving, less anxiety and less depression from admission to two months post-discharge, but no significant differences in strain and mutuality, as compared to FCG in the control group. Fam-FFC is feasible and has the potential to improve outcomes for hospitalized older adults and family caregivers.

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Author Contributions:

Drs. Boltz, Resnick, and Galvin, worked on all aspects of the research study including design, implementation, analysis, and development of the manuscript. Dr. Chippendale worked on literature review, data review, and drafting of the final manuscript.

Keywords

function focused care; transitions; family-centered

INTRODUCTION

Hospitalization-associated disability (HAD), manifesting as a decrease in the ability to complete one of the basic activities of daily living (ADLs) needed to live independently (bathing, dressing, rising from bed or a chair, using the toilet, eating, walking across a room, using stairs)¹ occurs in 35–50% hospitalized patients age 70 and above.² HAD is associated with longer hospital lengths of stay and adverse discharge outcomes including unplanned hospital readmissions,³ dependence on family members, discharge to a nursing home, and increased mortality.¹ Risk factors for HAD include advanced age,⁴ depression,⁵ cognitive impairment,^{6,7} limited social contact,⁷ the presence of a pressure ulcer,⁷ pre-admission limitations in ADLs⁶ and impaired mobility at baseline.⁸ Delirium, present at admission,⁸ or hospital-acquired,⁹ is associated with functional decline that often persists after the hospitalization.¹⁰

Hospital settings, which focus on correcting the acute admitting problem, are not designed clinically and operationally to support the goal of helping elders to regain or improve functionality and resume their roles, routines, or pre-illness activities.¹¹ The function-focused care philosophy has been used successfully to optimize function and physical activity among residents in long term care settings.^{12, 13} It has not, however, been incorporated onto acute care units sufficiently. FFC is a philosophy of care wherein physical activity and self-care approaches are incorporated into routine care as well as rehabilitation therapy. Although older adults themselves place a high priority on functional independence,¹¹ engagement in self-care and physical activity remains limited during hospital stays^{14–16} and may be more difficult in older adults with cognitive and functional impairments.

The Family Caregiver Role during Hospitalization

The family caregiver (FCG) can exert considerable influence over the older adult's care delivery, including the patient's activity level. For example, older adults are more likely to engage in self-care and walking programs when families encourage and advocate for them to do so.¹⁵ However, lack of understanding of the ramifications of inactivity and how to prevent deconditioning and functional loss may cause families to attempt to restrict physical activity. FCGs may believe that bedrest will promote recovery from an acute illness, or fear that the older adult will fall if physical activity is encouraged.^{15, 16} Furthermore, lack of information and limited engagement with care decisions is common,²² and encumber the FCG's efforts to advocate for the patient to be involved in physical activity, cognitive stimulation, and self-care.¹⁵ Thus interventions that support the role of FCGs in the functional recovery of hospitalized older adults warrant attention.

Hospitalization may provide respite for some FCGs. Conversely, during periods of acute illness, FCGs often experience strain, anxiety, depression,^{22,23} and stress in their

relationship with the care receiver.²⁴ Although FCGs provide health care providers with vital information about health, baseline function, and response to treatment,²³ little research has examined the role of family members in the assessment as well as care planning processes in the acute care setting. Li and colleagues²⁵ demonstrated that a two-session educational program provided during hospitalization demonstrated less role strain for family caregivers and better preparation to participate in care. Although patient outcomes (cognition, functional status) were inconclusive, this research, similar to prior research with both children²⁶ and older adults,²⁷ demonstrated the feasibility of providing education to families and actively including them in decision-making. Weaknesses of these prior studies included a lack of consideration for organizational factors that are known to significantly influence the care processes and outcomes for older adults.

Geriatric models of care, including ACE (Acute Care for the Elderly) units and inpatient geriatric rehabilitation have yielded improved functional outcomes at discharge.^{28,29} Additionally, the Hospital Elder Life Program (HELP), a volunteer-intensive, interdisciplinary delirium prevention intervention has demonstrated improved delirium outcomes.³⁰ These interventions, however, have not generally focused on post-acute care to support return to maximum and /or baseline function. Models of discharge planning³¹ and transitional care^{32,33} have shown to be effective in preventing re-hospitalization and reducing length of stay in hospitalized older adults, but have not focused on functional outcomes³⁴ or emphasized early involvement of FCGs. To limit HAD and promote the best possible post-discharge outcomes, Family-centered Function-focused care (Fam-FFC) is an educational /empowerment model initiated within a prepared care environment. Fam-FFC begins at admission to the hospital, and continues through the 60 day post-acute period, supporting the FCG, patient, and staff efforts to promote functional recovery.

The first aim of this study was to test the feasibility of Fam-FFC. The second study aim was to examine the impact of Fam-FFC upon functional outcomes of hospitalized older medical patients. We hypothesized that hospitalized older adults who are exposed to Fam-FFC will demonstrate: 1) less severity and duration of delirium; and 2) better physical function (ADL performance, walking performance, gait and balance), as compared to those who receive FFC education only, evaluated at discharge, 14 and 60 days post-discharge. We also hypothesized that hospitalized PWD who are exposed to Fam-FFC will demonstrate shorter lengths of hospital stay, less utilization of post-acute rehabilitation services, less discharges to nursing home, less recidivism (readmission to the hospital within 30 days for the acute admitting problem), less post-acute delirium, and will more likely return to prehospitalization (i.e., two weeks prior to admission) ADL performance at 60 days post-discharge. The third study aim was to examine the impact of Fam-FFC upon FCG preparedness for caregiving, affective status (anxiety, depression), role strain, and relationship with the patient. We hypothesized that FCGs who are exposed to Fam-FFC will experience more preparation for caregiving, less anxiety, less depression, less role strain, and better relationship with the patient, evaluated at discharge, 14 and 60 days post-discharge.

Theoretical Framework

The Fam-FFC intervention focused on outcomes for the patient was developed using a social ecological framework that acknowledges the intra-personal, interpersonal, environmental, and policy factors that influence functional outcomes.³⁵ This framework has guided other studies across settings that have addressed the organizational factors impacting the delivery of, and response to function-focused care.^{12,13} The aspects of the intervention focused on the FCG was guided by self-regulation theory.³⁶ Specifically, Fam-FFC recognizes that the FCG can serve as an invaluable resource to promote the patient's engagement in function and physical activity. Self-regulation theory³⁶ offers the theoretical perspective that the FCG's understanding of the patient's condition, particularly with regard to such things as function and delirium will strengthen the coping abilities of the FCG, and in turn, the affective response of the FCG through the acute illness experienced by the care recipient.²⁴ Effective support of the FCG role (through information, education and engagement in decision-making) is associated with increased role preparedness; improved quality of relationship with care recipient (i.e., mutuality); and less perceived difficulty in performing a role (role strain).³⁷

METHODS

Design

This study utilized a comparative repeated measures design in three medical units of a community teaching hospital in the Northeast US. The units were matched based on size, staffing, and physical configuration. One unit served as the intervention unit and two units served as control units. We utilized two control units in order to facilitate equal recruitment between the control and intervention arm.

Recruitment and Consent

Upon referral from the hospital staff, a research evaluator provided study information to patients and FCGs within 24 hours of admission to the unit. If the patient and FCG agreed to the study, the Evaluation to Sign Consent (ESC) form³⁸ was used to determine ability to sign consent. Patients who were unable to pass the ESC but were able to provide assent were enrolled when the legally authorized representative provided consent. Patient eligibility included: age ≥ 65 and English-speaking/reading. Patients who were known to be terminally ill and/or receiving hospice care or surgery were excluded. Family members age 21 and above whose relatives meet inclusion criteria were eligible if they a) could speak and read English; b) were related to the patient by blood, marriage, adoption, or affinity as a significant other; and c) were primary family caregivers who either lived with the patient or continued to provide caregiving from an alternate residence. The study was approved by the Institutional Review Board of the New York University School of Medicine and the study site.

Sample

Of the 502 patients screened, reasons for ineligibility included unavailability within 24 hours of admission due to tests scheduled (n= 31), a terminal illness and/or hospice enrollment

(n=45), family members who did not respond to call (n=3), and inability to understand English (n=2). Of the 421 eligible patient-family dyads who were informed about the purpose of the study and invited to participate, 100 dyads (24%) agreed to participate. The reasons for not participating in the study included: refusal due to patient fatigue or other symptoms (n= 147); FCG fatigue or lack of interest (n=133); and patient not wanting to burden the FCG with study involvement (n= 41). Two patients elected to drop out of the study and one died during the hospitalization. Ninety-seven dyads, 47 from the control units and 50 from the intervention unit, comprised the final enrolled sample. Two patients were lost to follow-up between 2 weeks and 2 months post-discharge, yielding 46 in the final control arm, and 49 in the final intervention arm.

Implementation of the Intervention

The Fam-FFC intervention aims to create an enabling care environment that promotes patient and FCGs in a plan for functional recovery, while actively engaging them in care-related decision-making. The Family-centered resource nurse (FCRN), a registered nurse, devoted 10 hours a week to implement the Fam-FFC intervention with the support of the research team. The FCRN was experienced in acute care of the older adults and was certified in gerontology. To support implementation and sustainability to the intervention, the study site appointed a nursing supervisor as the unit champion to work with the FCRN. The FCRN, with the support of the unit champion, implemented the components of Fam-FFC described in Table 1. Component I (Environmental and Policy Evaluation) and II (Staff Education) were initiated with the nursing staff prior to Component III (FamCare) in order to establish readiness. These components continued throughout the course of the intervention and overlapped with the FamCare component (FCG/patient education, jointly developed bedside goals and treatment plans; and post-acute follow-up). The control units received function-focused care education on, a modified version of the staff education component, as described in Table 1.

Measures

Descriptive Measures—Descriptive information for patients included age, race, sex, education, marital status, type of residence prior to hospitalization, and use of a mobility device. The presence of cognitive impairment, delirium, and co-morbidity upon admission were measured using the mini-cog,³⁹ Confusion Assessment Method,⁴⁰ and Charlson Co-morbidity scale⁴¹ respectively. Additionally, baseline physical function (self or family caregiver report of status two weeks prior to admission) was collected using the Barthel Index, a 14-item measure of the person's self-care performance.⁴² For family members information was obtained on age, race, sex, education, marital status, work status, and role in the family (spouse, child, other). All measures have established evidence of reliability and validity for use with older adults and FCGs, as noted below.

Patient Outcome Measures—The patient outcome measures of ADL performance, walking performance, gait and balance, and delirium severity were collected at admission, discharge, 14 days post discharge, and 60 days post-discharge. ADL performance was measured using the Barthel Index⁴² from the verbal report of the assigned nurse was obtained during the day of data collection. Additionally, the single item from the Barthel

Index that measures the ability to walk 50 feet was used to measure walking performance. Gait and balance was measured using the Tinetti Scale,⁴³ comprised of 12 items evaluating gait and 16 items evaluating balance. The severity of delirium was evaluated by the Delirium Severity Scale,⁴³ a 10 item scale that ranges from 0 (no delirium) to 32 (highest degree of severity).

Family Caregiver Measures—Outcome measures for FCGs were collected within 48 hours of patient admission to the unit, within 48 hours of discharge, and 14 and 60 days post-discharge. These were collected via pen and paper questionnaires. Preparedness for caregiving was evaluated using the Preparedness for Caregiving Scale, an eight-item self-rated instrument that asks caregivers how well prepared they believe they are for multiple domains of caregiving such as providing physical care and emotional support, setting up in-home support services, and dealing with the stress of caregiving. Items are rated 0 (not at all prepared) to 4 (very well prepared); scores can range from 0 to 32.^{36, 44} Anxiety was evaluated with the seven-item Hospital Anxiety and Depression Scale (HADS) subscale for Anxiety (HADS-A) and depression was assessed with the seven-item Hospital Anxiety and Depression Scale (HADS) subscale for Depression (HADS-D).^{46,47} Scores can range from 0–21 with scores categorized as follows: normal (0–7), mild (8–10), moderate (11–14), severe (15–21) for each of the HADS subscales.

Mutuality, defined as the positive quality of the relationship between caregiver and care receiver, and the ability of the caregiver to find meaning in the caregiving situation, was measured by the Mutuality Scale.^{36, 44} The Mutuality Scale includes dimensions of reciprocity, love, shared pleasurable activities, and shared values.³⁶ Fifteen items are rated on a 5-point scale that ranges from 0 (not at all) to 4 (a great deal) with scores ranging from 0 to 60 (high mutuality).^{36, 44} Caregiver strain was evaluated by the Modified Caregiver Strain Index (CSI), a 13-question tool that measures strain related to the following domains affected by caregiving: employment, financial, physical, social and time.^{47, 48} A bedside log also detailed FCG involvement in care by type of activity and time spent.

Data analysis

Descriptive analysis of the data according to intervention arm was performed to assess for differences in demographics and baseline variables. Correlations between sample characteristics and outcome variables were examined to identify potential covariates. A two (group) by four (time) repeated measures analysis of variance was used with patient and family study outcomes as the dependent variable. For each outcome, scatterplots, frequencies and boxplots were evaluated to assess model assumptions. Mauchly's test was used to evaluate sphericity. When the sphericity assumption was violated, the Greenhouse-Geisser F-test was used when drawing conclusions regarding the time * treatment interaction effect. Post hoc analyses were conducted using the Bonferroni correction when preceded by significant analysis of variance effects. ANOVA technique compared length of hospital stay in treatment groups. Chi-square analysis was performed to compare treatment differences in patients with regard to the number of new admissions to nursing homes upon hospital discharge, unplanned hospital readmissions within 30 days of discharge, return to baseline function, and delirium at 2 months post-discharge.

RESULTS

Patient Characteristics

Table 2 reports the patient and family caregiver characteristics. The majority of patients were female (53%); white (89%), married (51%) or widowed (40%), with a mean age of 80.8 (± 7.5). Thirty-three percent of patients were college educated. Most patients (95%) were admitted from a private residence; the rest were admitted from assisted living. Self-reported pre-admission Barthel Index (two weeks prior to admission) was 91.1 (± 17.0) and 43% used an assistive device for mobility. Upon admission, 52% presented with cognitive impairment; 25% with delirium; and 29% reported frequently feel sad or depressed. The average Charlson co-morbidity was 3.4 (± 2.5). There were no significant differences between the groups with regards to patient characteristics.

Family Caregiver Characteristics

The majority of FCGs were daughters (34%), followed by female spouses/partners (31%). Most FCGs were married (78%); 42 percent were college educated or higher. Most FCGs were in the age range of 46–65 (38%) and a little more than half (54%) were employed outside the home. The only significant difference between the treatment groups was the role relationship between the patient and FCG ($p=.02$); female spouses and sons were more represented in the intervention group and male spouses in the control group. Role relationship was significantly correlated to FCG strain at all time points and was controlled for in the analysis.

Patient Outcomes

Table 3 reports primary patient outcomes at discharge, two weeks, and two months post-discharge. There were no significant differences between the groups with regards to outcome variables evaluated at admission. Repeated measures ANOVA demonstrated that the intervention was associated with a significant decrease in overall delirium severity ($F(1.3) = 3.5, p=.05$). Post hoc tests revealed that the Fam-FFC arm demonstrated less delirium severity from admission to all other time points. Patients who participated in Fam-FFC demonstrated better ADL performance ($F(2.3) = 3.3, p=.03$), with improvement evident at 2 months after discharge. Mean walking performance differed significantly between intervention arms ($F(2.5) = 3.6, p=.02$); post hoc tests revealed that Fam-FFC elicited less decrease in walking performance at to months post-discharge. There was no significant effect of the intervention on Tinetti Gait and Balance ($F(1.4) = 1.9, p = .173$).

Discharge outcomes are shown in Table 4. The average hospital length of stay did not differ significantly between the intervention group (5.1 ± 3.0) and the control group (5.9 ± 7.7). There wasn't a significant difference in the number of patients utilizing post-acute rehabilitation services or transferred to a nursing home. There was a modest treatment effect upon the number of 30-day hospital readmissions, which was lower in the treatment group ($n= 7, 14\%$) as compared to the control group ($X^2 = 6.4, p = .01$). Patients exposed to Fam-FFC showed less delirium two months after discharge ($X^2 = 4.5, p = .04$) and the number of patients who returned to baseline ADL performance was significantly higher in the group exposed to Fam- FFC ($X^2 = 9.7, p = .002$).

Family Caregiver Outcomes

The outcome variables for FCGs are presented in Table 5. There were no significant differences between the groups with regards to FCG baseline assessments. The intervention was associated with a significant increase in preparedness for caregiving ($F(2.6) = 4.4, p = .007$); post hoc tests revealed that Fam-FFC was associated with increased preparation for caregiving from admission to two months post-discharge. The mean FCG anxiety differed significantly between groups ($F(1.9) = 9.4, p < .0001$); Fam-FFC was associated with less anxiety from admission to two months post-discharge. The percentage of FCG experiencing anxiety increased from 16% at admission ($n=12$) to 34% ($n=16$), $p=.011$ at discharge in the non-intervention group, but decreased from 36% ($n=18$) to 22% ($n=11$), $p < .0001$ in the intervention group. Mean depression scores differed significantly between intervention arms ($F(2.1) = 4.4, p = .012$). The Fam-FFC group demonstrated less depression from admission/discharge (22%, $n=11$) to two months post-discharge (10%, $n=5$; $p < .0001$) whereas the percentage of FCGs in the non-intervention group experiencing depression increased from 11% ($n=5$) to 13% ($n=6$), $p=.023$.

There was no significant effect of the intervention on mutuality ($F(2.4) = 2.2, p = .10$) or role strain ($F(1.9) = .789, p = .455$), controlling for FCG role relationship.

Treatment Fidelity

The possibility of contamination was avoided by avoiding data collection during the times of FamCare implementation. The evaluation of the physical environment demonstrated consistency between three time points: the beginning of the study, three months and nine months. The staff training utilized a variety of methods to facilitate 100% of the nursing staff involvement on all units. The average training post scores was 95 (± 7.1). The FCRN coordinated all components of FamCare, based upon a review of documentation, patient goals and interactions with patients and FCGs. Observation of care delivery by nursing staff showed 90% agreement between the care plan and enactment of the plan. The areas of non-adherence included supporting patients to walk to the bathroom and self-care during bathing. Comparison of the logs describing FCG role in care showed 94% agreement with the care plan. Logs reported that FCGs were involved in care as follows: information-sharing (96%), decision-making (94%), companionship (92%), advocating (72%), coordination (64%), and direct care (56%). Direct care activity included cognitive stimulation (e.g., providing crosswords, puzzles, newspapers), assistance with meal, bathing/showering, hygiene, and walking. The post-acute follow-up by the FCRN was consistently provided. Post-acute adherence to the care plan occurred in 92% ($n = 45$) of the patients; adherence did not occur in four patients (three discharged to the nursing home setting, one to home).

DISCUSSION

The findings from this study support the feasibility of Fam-FFC and show preliminary support of its potential to improve hospital outcomes for both patients and FCGs. Moreover, they study was instructive for methodological and measurement modifications for future research.

The trend to post-acute delirium abatement with Fam-FFC suggests that a systemic-approach to function-focused care may promote cognitive recovery post-hospitalization. Given that the resolution of delirium among post-acute patients appears to be a prerequisite for functional recovery,¹⁶ these results are clinically relevant and warrant further investigation. FCGs may be an untapped resource playing an important role in delirium prevention models such as HELP.²⁹ Future research examining the treatment effect in a larger sample, in a randomized controlled trial over longer periods of time is warranted to evaluate clinical efficacy. Additionally, the independent contribution of the various components of the intervention including family engagement will be considered.

The study also demonstrated that patients exposed to Fam-FFC had improvements in ADL performance, most likely attributable to care plans and staff interventions that focused on self-care. Although they did not consistently provide direct care, in their role as advocates FCGs may have contributed to staff follow-through on function-focused activity. Walking performance did not improve in either group, but was better in the intervention arm, perhaps related to improved FCG understanding of the benefits of mobility and their encouragement of the patient in physical activity. Recognizing the limitations of self-report, in future study, the researchers will add observational and objective (actigraphy) measures of physical activity in order to better quantify mobility as an outcome. These measures will also be used to provide ongoing feedback to patients and FCGs, to support evaluation and modification of the function-focused care plan. There were no improvements in gait and balance, evident in Tinetti Gait and Balance scores that indicated moderate fall risk⁴² in both the intervention and control groups. These results as well as the mobility scores indicate the need to incorporate fall prevention strategies, including gait, balance, flexibility, endurance, and strength training in discharge planning and follow-up.

Recidivism was less in the Fam-FFC group, consistent with research demonstrating the benefits of nurse-implemented transitional care.^{31, 32} Unlike most interventions that promote positive transitions, Fam-FFC expanded its focus to include engagement of FCGs at an early stage in the hospitalization to support the goal of post-acute functional recovery. Additionally, this intervention did not require an advanced practice nurse, making it potentially more feasible in many settings.

The study demonstrated the positive influence of education and engagement upon FCG preparedness for caregiving, underscoring the opportunity that the hospitalization provides to support FCG effectiveness. The FCG exposed to Fam-FFC showed less anxiety, and a modest reduction in depression, consistent with FCG studies in the community that have demonstrated the positive effect of education upon sense of well-being and caregiving effectiveness.⁵⁰ We recognize however that ongoing psycho-educational support will likely be necessary to support positive affective states in FCG involved in long-term caregiving.

Exposure of FCGs to Fam-FFC did not decrease mutuality and strain. FCGs demonstrated high mutuality at baseline, making it difficult to influence and measure changes over time. Despite the lack of significant change in mutuality and strain, examination of these measures will continue, perhaps within an expanded social ecological model which considers factors

such as the FCG's health, role relationship, competing demands, health literacy, and cultural preferences.

The environmental assessment was not time-consuming or onerous to conduct and could be incorporated into routine safety checks on medical units. However, there is the potential that in older, less well-maintained hospitals, costly modifications would warrant capital expenditures and adjustment in the timeframe for implementation of the intervention. The education was scheduled to accommodate staff availability and in multiple formats and so as not to warrant costly staff replacements.

Hospital management support of the study in the form of the unit champion was key to implementation, facilitating not only logistics (training and communication) but also follow-through by nursing staff on the care plan. The patients discharged to a nursing home did not have this advantage. The Fam-FFC intervention will be expanded to include a partnership with the post-acute care setting facilitated by the use of a facility-based champion and collaboration with staff, including the rehabilitation team. Future research will examine this expanded model and also include a cost-benefit analysis of Fam-FFC.

Study Limitations

The generalizability of the study findings is limited due to the small, racially non-diverse sample in three units of one hospital, which did not include nursing home residents. Another limitation is the potential of recruitment bias, given that the study participants represented about one-fourth of older patients who were eligible. There is the potential that patients with higher acuity and symptoms tended to not participate and thus were underrepresented. There is also the possibility that only patients and FCGs who had functional recovery as a goal and/or family members who were still engaged in the patient's recovery comprised the enrollees. Another limitation is the lack of blinding of data collectors and the reliance on patient and staff reports of ADL status. Finally, the amount of rehabilitation services received by patients in both the acute care and home care setting was not assessed and could be a confounding variable.⁴⁹

CONCLUSION

Despite limitations, the study supports the use of Fam-FFC to engage patients, families, and nursing staff in promoting functional and cognitive recovery in hospitalized older adults. Additionally, findings show that Fam-FFC can increase the well-being of FCGs, who provide the bulk of care to care-dependent older adults.⁵⁰ From an organizational perspective, Fam-FFC offers the potential of preventing costly hospital readmissions. Future research in a larger more diverse sample will support its efficacy and afford the possibility of risk stratifying the patient sample for functional decline to evaluate possible treatment algorithms.

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Table 1

Description of Family-centered, Function-focused Care (Fam-FFC) Intervention

Component	Person responsible	When delivered	Recipient	Description
Environmental/policy evaluation	Family-centered resource nurse (FCRN)	Month one, three and nine	intervention unit	<ul style="list-style-type: none"> Assessment and modification as needed of lighting, pathway clearance, seating, bed height, toilet height, access to/storage of sensory and mobility aids. Shift report that includes the patient/ family. Bedside write boards to facilitate communication and storage of care plans
Staff education	Family-centered resource nurse (FCRN) and unit champion	Month one	nursing staff on the intervention and non-intervention unit	<ul style="list-style-type: none"> Educational sessions addressing: <ul style="list-style-type: none"> Causes of/ prevention / management of functional decline and delirium Assessment of cognition, mood, function (capability and performance) Evaluation of patient/family preferences and needs Incorporating function-focused care into routine activities Communication with patients and families including motivating patients * Methods of partnering with FCGs (active listening, information-sharing, care planning, promoting advocacy and patient/family engagement in decision-making)* Discharge preparation* <p>* Content not included in the non-intervention unit education</p>
		Month two, three, and five	nursing staff on the intervention unit	<ul style="list-style-type: none"> Educational reminders of educational key points provided in staff mailboxes and posted on the educational board of the intervention unit.
FamCare	Family-centered resource nurse (FCRN)	Month two-month ten	FCG and patients on the intervention unit	<ul style="list-style-type: none"> Information on the admitting condition, diagnostics, and treatment Family/patient education that addresses: <ul style="list-style-type: none"> Rationale for interdisciplinary interventions to prevent delirium and functional decline (e.g., avoiding high-risk medications and encouraging mobility) Techniques the FCG could employ (e.g., encouraging and motivating self-care and physical activity, supporting cognitive and social engagement to support return to normal roles and routines, help with meals) Discharge checklist (e.g., follow-up care for the acute admitting problem as well as function focused care – physical activity/routine, social engagement, cognitive stimulation) Systematic inclusion of FCG and patient in: <ul style="list-style-type: none"> Assessment (including baseline cognition and physical function) Jointly developed bedside goals and care plans that support functional recovery and prevention of complications (communication, mobility/ physical activity, self-care, cognitive stimulation, nutrition, sleep, appropriate medication use, comfort

Component	Person responsible	When delivered	Recipient	Description
				<p>measures, anxiety relief), updated daily with assigned nursing staff, FCG, and patient. Collaboration with other disciplines including rehabilitation emphasized.</p> <ul style="list-style-type: none"> ◦ Plans that delineate FCG involvement in care ◦ Discharge teaching and planning incorporating function-focused care dimensions in addition to management of the medical condition <ul style="list-style-type: none"> • Post-acute follow-up by FCRN to provide ongoing education and modification of the function- focused care plan through: <ul style="list-style-type: none"> ◦ Home visit within 48 hours of discharge ◦ Weekly telephone calls for a total of 4 weeks ◦ Coaching the patient and FCG to collaborate with the post-acute providers

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Table 2

Patient and Family Caregiver Characteristics

	Total (n=97)	Non- intervention group (n=47)	Intervention group (n=50)	<i>p</i> Value
	n (%)			
Patient characteristics				
Female	51 (53)	29 (62)	22 (44)	0.08
White	86 (89)	41(87)	45 (90)	0.16
Married	49 (51)	24 (50)	25 (50)	0.37
College graduate	31 (33)	14 (30)	17 (34)	0.32
Admitted from private residence	92 (95)	45 (96)	47 (94)	0.84
Cognitive impairment	50 (52)	26 (55)	24 (48)	0.47
Delirium at admission	24 (25)	12 (26)	12 (24)	0.86
Depression	28 (29)	13 (28)	15 (30)	0.47
Use of mobility device	42 (43)	20 (43)	22 (44)	0.89
Persistent pain	47 (48)	24 (51)	23 (46)g	0.62
	mean (SD)			
Age	80.6 (7.9)	79.5 (8.1)	82.2 (6.7)	0.07
Charlson Co-morbidity	3.4 (2.5)	3.3 (2.7)	3.5 (2.3)	0.79
Preadmission Barthel	91.1 (17.0)	89.3 (20.7)	92.8 (12.9)	0.32
Family caregiver characteristics				
	n (%)			
Relationship to patient				0.02
female spouse	30 (31)	11 (23)	19 (38)	
male spouse	15 (15)	12 (26)	3 (6)	
daughter	33 (34)	17 (36)	16 (32)	
son	8 (8)	1 (2)	7 (14)	
other	11(11)	6 (13)	5 (10)	
White	86 (89)	41(87)	45 (90)	0.16
Married	76 (78)	36 (76)	40 (80)	0.31
College graduate	40 (41)	21 (45)	19 (38)	0.81
Age				0.48
31–45	9 (9)	6 (13)	3 (6)	
46–65	37 (38)	15 (32)	22 (44)	
66–80	32 (33)	16 (34)	16 (32)	
over 80	19 (20)	10 (21)	9 (18)	
Employment outside the home	52 (54)	27 (57)	25 (50)	0.47

Table 3

Primary Patient Outcomes at Discharge, Two Weeks, and Two Months Post-discharge

	Non- Intervention	Intervention		
	M (SD)	M (SD)	F (df)	p Value
Delirium severity (range: 0–36)			3.5 (1.3)	.05
Admission	4.4 (7.4)	4.5(7.2)		
Discharge	4.7 (6.9)	1.7 (2.3)		
2 weeks	2.6 (3.5)	0.76 (1.3)		
2 months	2.4 (3.2)	0.82 (0.81)		
Physical Function				
ADL performance (Barthel Index, range: 0–100)			3.3 (2.3)	.03
Admission	82.2 (25.7)	81.6 (21.7)		
Discharge	79.3 (25.4)	81.7 (23.0)		
2 weeks	78.8 (27.7)	84.8 (19.6)		
2 months	81.2 (27.4)	91.2 (15.2)		
Walking performance (50 yards, range: 0–15)			3.6 (2.6)	.02
Admission	11.2 (5.6)	12.9 (4.1)		
Discharge	10.8 (5.4)	12.1 (4.9)		
2 weeks	11.0 (5.5)	12.0 (5.2)		
2 months	9.1 (5.0)	12.0 (4.9)		
Gait and Balance (range: 0–28)			1.9 (1.4)	.24
Admission	20.2 (8.1)	21.0 (13.5)		
Discharge	20.1 (8.0)	19.1 (8.6)		
2 weeks	19.8 (8.5)	19.6 (8.6)		
2 months	20.2 (8.1)	20.1 (8.0)		

Table 4

Patient Discharge Outcomes

	n (%)		Chi-square	p Value
	Non-intervention	Intervention		
Discharge to a nursing home	13 (28)	9 (18)	2.3	.80
Utilization of post-acute rehabilitation services	30 (64)	29 (58)	4.0	.68
Readmission to hospital within 30 days	17(36)	7 (14)	6.4	.01
Delirium present 2 months post- discharge	8 (17)	2 (4)	4.5	.04
Failed to return to baseline function by 2 months after discharge	16 (34)	4 (8)	9.7	.002
Length of stay (mean {SD})	5.9 ± 7.7	5.1 ± 3.0		.49

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Table 5

Family Caregiver Outcomes at Discharge, Two Weeks, and Two Months Post-discharge

	Non-intervention	Intervention		
	M (SD)	M (SD)	F (df)	p Value
Preparedness for Caregiving (range: 0–32)			4.4 (2.6)	.007
Admission	23.6 (7.0)	21.9 (8.0)		
Discharge	22.4 (7.8)	23.6 (7.0)		
2 weeks	23.9 (7.4)	23.2 (7.2)		
2 months	23.7 (7.0)	25.2 (7.0)		
Affective Status				
Anxiety (range: 0–21)			9.4 (1.9)	<.0001
Admission	5.6 (3.3)	6.5 (4.3)		
Discharge	5.6 (3.8)	6.3 (4.5)		
2 weeks	6.0 (4.8)	5.7 (4.2)		
2 months	6.2 (5.3) ^a	4.5 (3.9) ^b		
Depression (range: 0–21)			4.4 (2.1)	.012
Admission	3.2 (2.8)	3.8 (3.7)		
Discharge	3.5 (2.0)	3.8 (3.9)		
2 weeks	4.1 (3.8)	3.6 (4.2)		
2 months	4.0 (3.9) ^c	3.0 (3.8) ^d		
Role Strain (range: 0–26)			.789 (2.0)	.455
Admission	4.5 (4.8)	5.1 (5.2)		
Discharge	5.1 (5.5)	5.8 (6.0)		
2 weeks	5.8 (5.1)	5.0 (4.8)		
2 months	4.7 (5.0)	4.9 (4.7)		
Mutuality (range: 0–56)			2.2 (2.4)	.103
Admission	48.3 (12.3)	49.9 (10.7)		
Discharge	48.2 (12.4)	48.2 (13.7)		
2 weeks	45.5 (15.3)	49.1 (10.9)		
2 months	45.3 (15.8)	49.4 (10.7)		

^aPercentage of FCG experiencing anxiety increased from 16% (n=12) to 34% (n=16) $p=.011$.

^bPercentage of FCG experiencing anxiety decreased from 36% (n=18) to 22% (n=11), $p < .0001$.

^cPercentage of FCG experiencing depression increased from 11% (n=5) to 13% (n=6), $p=.023$.

^dPercentage of FCG experiencing depression decreased from 22% (n=11) to 10% (n=5), $p < .0001$.