

Clinical Outcomes of Aging in Place

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Abstract

Background: Programs such as Medicaid Home and Community-based Services (HCBS) have provided an alternative to institutionalization through community-based long term care services, however, there are limited studies on the clinical outcomes of participants in these programs as compared to nursing home residents. **Objective:** To compare clinical outcomes between older adults who resided in nursing homes to a group of similar older adults who received services in a HCBS program called “Aging in Place” (AIP). **Methods:** The AIP program was developed by the MU Sinclair School of Nursing in cooperation with the State of Missouri’s HCBS program. The AIP intervention consisted of nurse coordination of the HCBS program and Medicare home health services. A total of 78 Aging in Place clients were matched with 78 nursing home residents on admission period, activities of daily living (ADL), cognitive status, and age. The Minimum Data Set (MDS) was collected on the AIP group over a two-year period at admission and every 6 months. Cognition was measured by the MDS Cognitive Performance Scale (CPS), ADLs by the sum of five MDS ADL items, depression by the MDS- Depression Rating Scale, and Incontinence by rating on two MDS items related to urinary continence. The Cochran-Mantel-Haenszel (CMH) method was used to test the association between the AIP intervention and clinical outcomes. **Results:** The AIP group clinical outcomes were better at a statistically significant level (less than 0.05) for the following outcomes (a) cognition at 6, 12, and 18 months ($p = 0.00$), (b) depression at 6 and 12 months ($p=0.00$), (c) ADL at 6 ($p=0.02$), 12 ($p=0.04$), and 24 ($p=0.00$) months, and (d) Incontinence at 24 ($p = 0.02$) months. In all four outcome measures the AIP group stabilized or improved outcome scores while the nursing home group’s outcome scores deteriorated. **Conclusions:** Study results suggest that community-based care with nurse coordination enhances clinical outcomes of long term care clients. **Key words:** Home and community based services, long term care, nursing case management.

Clinical Outcomes of Aging in Place

The aging of the nation's population is causing major changes in the health care system. Dramatic restructuring is needed to prepare for the burgeoning needs of the growing older population. The population of the oldest old, those who are age 85 and older, is expected to expand to over 9 million by the year 2030 (US Census, 2000). By the year 2020, 19% of adults age 65 and older will have limitations in activities of daily living (ADL) and approximately 4% will be severely disabled (Administration on Aging, 2001). It is estimated that as many as one-half of the individuals over age 85 experience some type of cognitive deficit (Evans et al., 1989). Within this group of aging individuals it is the "oldest old", those age 85 and older, who will require the majority of long term care services. New methods of delivering care are necessary and desired, especially in the area of long-term care, as the baby boomers move into their golden years.

Older adults prefer to live in their own homes for as long as possible. Most elders prefer that they receive needed long term care services in their home instead of in an assisted living facility or nursing home (Mattimore et al., 1997). For many older adults home-based services are a viable alternative to nursing home placement. Even with this alternative available it is estimated that over 15% of individuals residing in nursing homes are there inappropriately (Spector, Reschovsky, & Cohen 1996). Reasons for inappropriate placement include (1) public financing that favors nursing homes over alternatives, (2) state regulations that reduce viable options, and (3) lack of consensus on the best clinical setting.

Recognition of the institutional bias of the Medicaid program prompted the creation of the Medicaid Home and Community-based Services (HCBS) Waiver program. This was established through the Omnibus Budget Reconciliation Act (OBRA) of 1981. The purpose of

the HCBS Waiver program was to encourage states to develop alternative options to institutional care for those in need of long term care services (Duckett & Guy, 2000). However, there is large variation from state to state in how these programs are organized and implemented (LeBlanc, Tonner, & Harrington, 2000). Evaluation of the effectiveness of the HCBS waiver programs is difficult since each state determines its own eligibility criteria, and unlike nursing home care, there is no standardized clinical assessment to allow clinical outcome comparisons between community and institutional long term care.

The majority of studies conducted to compare community-based long term care to institutional care have focused on comparing the cost of the two different approaches. Demonstration projects such as the Channeling Demonstrations of the early 1980's had disappointing results related to cost savings. In fact, it was found that the majority of the demonstration projects were more expensive than institutional care (Applebaum, Harrigan, & Kemper, 1986; Weissert, Cready, & Pawelak, 1988). One reason cited for the additional cost of the Channeling Demonstrations was that individuals targeted for the home care programs were not at high risk for nursing home placement. Therefore services were provided to additional low risk people rather than to those who were at high risk for institutional care. In addition, improvement in health outcomes was very limited, usually benefiting only a handful of residents. Outcome measures in these studies were often based on service utilization such as number of hospitalizations or emergency department visits. There was limited evidence of higher functioning in activities of daily living (ADLs) in community clients (Hughes, 1985).

Studies of community-based care in the post acute home health period, usually reimbursed by Medicare, have demonstrated home health care to be clinically efficacious during transition periods or short time periods post hospitalization (Capitman, 2003). Kane et al. (2000) found that persons discharged to home health care had better function and lower care costs when

compared to persons discharged to nursing homes. Another study by Hadley, Rabin, Epstein, Stein, and Rimes (2000) found that post acute care functional status of community dwelling elders was higher for those who received home health care as opposed to those who did not. In a study by Naylor et al. (1999) post acute home health care was enhanced by comprehensive discharge planning and follow-up visits by advanced practice nurses (APNs). Subjects who received the APN intervention had fewer hospitalizations and emergency department visits, however, no difference was found in functional status between the experimental and control groups. However, Tinetti et al. (2002) enhanced post acute home health care with a restorative care model. Subjects receiving care via this model scored higher in functional status and had lower utilization rates than the comparison group.

Current federal initiatives, such as the Program for All Inclusive Care for the Elderly (PACE) and Social Health Maintenance Organizations (S/HMOs) are designed to provide coordinated health care to individuals who are certified as nursing home eligible but are able to live safely in the community at the time of enrollment. Providers are paid at a capitated rate based on Medicare and state Medicaid rates. Outcomes of PACE programs have been positive, including good consumer satisfaction, reduction in use of institutional care, cost savings to public and private payers of care, including Medicare and Medicaid. Comparison of PACE participants to individuals who declined PACE participation found a higher level of ADL functioning and self reported quality of life in PACE users (Chatterji, Burstein, Kidder, & Wilte, 1998).

What is lacking in the literature are studies that examine differences in multiple clinical outcome measures such as depression, cognition, and incontinence, in addition to ADL measures, in older adults who are receiving long term care in community and institutional settings. One study was found that compared residents of assisted living facilities to nursing

home residents on ADLs, psychological well-being, and pain and discomfort (Frytak, Kane, Finch, Kane, & Maude-Griffing, 2001). No difference was found in the outcome trajectories of these measures, suggesting that a lower level of care provided in assisted living did not result in poorer outcomes of its residents.

In this paper we will describe the clinical outcome component of the evaluation of a community-based long term care program called “Aging in Place”. The purpose of this evaluation was to compare clinical outcomes between older adults who resided in nursing homes to a group of similar older adults who received services in the Aging in Place program. The clinical outcomes of interest were ADLs, cognitive function, depression, incontinence, and pressure ulcers.

Aging in Place Program

In Missouri, the state funded HCBS program is called Missouri Care Options (MCO). A person is considered eligible for MCO if the individual is (a) "medically eligible" for nursing facility care, (b) could reasonably have care needs met outside a nursing facility, and (c) is qualified for Medicaid funding. Individuals are screened and assigned a Level of Care (LOC) score by a MCO case manager who then authorizes services, otherwise known as the service plan. Services in the MCO program include basic personal care, advanced personal care, nurse visits, homemaker care, and respite care. An MCO caseworker authorizes a specified number of monthly units and the provider is reimbursed retrospectively on the authorized units provided.

Although the MCO program authorizes nurse visits, the major focus of the program is homemaking and personal care. MCO clients who are assessed as requiring nursing care are provided a limited amount of nursing visits per month. However, the reimbursement for nurse visits is very low, barely covering the labor cost of a visit, and there is no reimbursement for indirect care activities such as care coordination. With such poor reimbursement there is little

incentive to coordinate the care of MCO clients. Clients receive only those services that can be handled easily within a short visit, such as medication box refills. In addition, the MCO caseworkers have large caseloads and are required to visit the MCO client only once a year. Because of this, identification of health and/or service problems often is not completed in a timely manner. This is problematic, especially considering the frailty of the MCO clients.

To further complicate the care management of these clients, if a client requires Medicare Home Health services a different agency or a separate department of an MCO authorized agency provides the care. There is often little or no coordination between Medicare home health and MCO service provider. This is due in part to the presence of different regulations and reimbursement methods under which each program functions. An MCO client who is acutely ill may receive Medicare home health services, but once the client's condition stabilizes, Medicare home health services are discontinued. The disconnect between these two types of home-based services is not conducive to providing the coordinated care needed for frail chronically ill older adults.

Working with the Missouri Department of Health and Senior Services, the University of Missouri Sinclair School of Nursing created an enhanced version of the MCO program called "Aging in Place". To implement the Aging in Place (AIP) program a home care agency called Senior Care was formed. To provide the AIP intervention, Senior Care secured a home health license, Medicare certification and became a designated MCO provider. In the AIP program clients were assigned a nurse care coordinator who provided intensive post acute Medicare home health care during an episode of illness, but also continued to follow the client in the MCO program to be sure his or her health care needs were met after an illness had stabilized. This type of monitoring helped the nurse care coordinator identify problems at the onset, so that more severe problems could be prevented or treated early, thus minimizing the client's health risk. In

addition, nurse care coordinators identified barriers to care, as well as procured and coordinated services required by the frail older adult. Working closely with the client's primary care physician, as well as other health care providers, a plan of care was developed in partnership with the client. Clients were monitored and services were enhanced or reduced, as clients' health care needs changed.

Methods

The purpose of this study was to evaluate the clinical effectiveness of the AIP program as an alternative to nursing home placement for long term care. The design of the evaluation was quasi-experimental, using an individual matched group of nursing home residents for comparison. The Missouri Minimum Data Set (MDS) data repository provided data to assist in identifying nursing home residents in Mid Missouri. A major criticism of community-based long term care programs is that rather than substituting for nursing home placement, individuals at low risk for nursing home placement often are enrolled. Matching the comparison group on key variables provides a comparison group with similar risk for clinical outcome decline. Variables included in the matching strategy were age, AIP enrollment date and NH admission date, ADLs, and cognitive function. The NH admission date, ADLs, and cognitive function were derived from the NH Minimum Data Set.

Since MDS collection is not mandated on private pay nursing home residents, only subjects with Medicaid as their payment source for long term care were included in this evaluation. There were 93 clients enrolled in the AIP program who also were Medicaid eligible. Of this group, 78 individuals were matched to Medicaid nursing home residents in Mid Missouri for a total of 156 subjects. Subjects were matched on ADLs (within two points), cognitive performance (within one point), age (within four years), and admission date (within 90 days) using data from the Missouri MDS repository.

In the Omnibus Reconciliation Act of 1987 (OBRA 87), Congress mandated the development of the Minimum Data Set (MDS) for resident assessment and care planning (Morris et al., 1990). This Act required routine assessment of all Medicare and Medicaid residents using the MDS, which is a part of the resident assessment instrument (RAI). MDS data are used to develop a plan of care and are also used to determine payment for all Medicare nursing home residents using the resource utilization groups (RUGs) (Fries & Cooney, 1985). MDS data is also used to measure quality of care through the identification of key quality indicators or measures (Zimmerman et al., 1996). MDS data routinely are collected upon admission, quarterly, at times of significant change of condition, and annually as mandated by OBRA 87. Reliability of the MDS items has been tested in multiple studies (Hawes, Morris, Phillips, Mor, Fries, & Nonemaker, 1995; Morris et al., 1990; Morris et al., 1997; Mor, 2004). In a recent large field reliability trial, over 85% of the MDS elements manifested adequate interrater reliability ($\kappa > 0.6$) (Mor et al., 2003).

For this study the clinical outcomes of interest were cognition, ADLs, depression, pressure ulcers and incontinence. The MDS has been found to work equally well in community and nursing home settings (Morris, et al. 1997). Nonetheless the data elements were reviewed again to determine the appropriateness of the assessment for use in the community setting, because the assessment was initially designed for use in institutionally-based care. The 1997 RUGS III Quarterly had the data elements needed to measure the clinical outcomes of interest. MDS quarterly data elements were collected on admission and every six months on all AIP program participants who entered the program from April 1, 2000 to December 31, 2002. Nursing staff were trained on the use of the MDS by an advanced practice nurse with significant training, research, and consultation experience using the MDS.

An ADL measure was defined as the sum of five MDS ADL items reflecting the need for assistance with bed mobility, transfers, locomotion, eating, and toilet use. Each of these items is scored 0 to 4 with zero indicating independent functioning ("no need for help or oversight") and 4 indicating total dependence ("full staff performance of the activity"). The summated scale thus has a range of 0-20 with larger values corresponding to greater impairment in ADL functioning. Coefficient alpha for this five item scale was 0.90 for both the AIP sample and for a large sample of LTC assessments.

Cognition was measured using the MDS Cognitive Performance Scale (CPS) (Morris, et al. 1994). The CPS is a seven point ordinal scale with 0 indicating intact cognitive status and 6 being severely impaired. The CPS scale uses five MDS cognitive items (comatose, short term memory, ability to make decisions, making self understood, and eating performance) within a single hierarchical cognitive rating scale creating seven categories of cognitive impairment. Validity and reliability have been tested and the CPS has demonstrated substantial agreement with the Mini-Mental State Exam in the identification of cognitive impairment (Hartmaier, Sloane, Guess, & Koch, 1994; Hartmaier, Sloane, Koch, Mitchell, & Phillips, 1995).

The Minimum Data Set-based depression rating scale was used to measure depression in the study participants. This instrument is derived from the seven mood indicator items in the MDS. The items include: 1) making negative statements, 2) persistent anger with self and others, 3) expressions of unrealistic fears, 4) repetitive health complaints, 5) repetitive anxious complaints, 6) sad, pained worried facial expressions, and 7) crying, tearfulness. Each item is rated on a scale of 0-2 based on frequency of the observed item. Construct validity and sensitivity have been tested and the MDS depression rating scale performance compares favorably to the 15-item Geriatric Depression Scale (Burrows, Morris, Simon, Hirdes, & Phillips, 2000).

Incontinence was measured by two categories. An individual scored zero if always continent, one if usually or continent (one or fewer times a week) or occasionally incontinence (2+ times a week, but not daily) and a two if frequently (incontinent daily but some control present) or always incontinent. The incontinence items in the MDS were tested and found to accurately identify incontinent nursing home residents (Crooks, 1995). Pressure ulcers were defined as a rating of stage one or higher on MDS item M2a.

Analysis

Outcome variables in this study are all ordinal scaled measures and thus rank-based nonparametric methods were used. The Cochran-Mantel-Haenszel test (CMH) with modified ridit scores (Stokes, Davis, & Koch, 2000) were used to compare groups at each follow-up point. The CMH test in combination with the rank transformation provides a stratified version of the Kruskal-Wallis Test (Agresti, 1990). In the analysis of each outcome the baseline value of that outcome is used as the stratifying variable. Although the nursing home group was constructed in such a way as to be comparable to the Aging in Place group, this analysis further adjusts for individual differences in initial status. In a secondary analysis we tried to determine if the point of drop out from the study was related to initial ADL and cognitive status. Groups were formed based on the last follow-up point and the Kruskal-Wallis test was used to test for differences in these groups with respect to initial ADL and CPS scores.

Findings

Subject age ranged from 72 to 94 with a mean age of 72. The AIP group was more racially diverse with 27 % black versus 4% in the nursing home group. Also the AIP group was less likely to be married (Table 1). Since subjects were enrolled over a 30 month period, the number of subjects per time period is dependent not only on attrition, but also is related to time of enrollment. For example, 15 AIP subjects were enrolled for less than 12 months and therefore

had outcome data collected at only at baseline and at six months. To control for the effect of time enrolled, groups were matched on quarter of enrollment, therefore allowing for each group to receive a similar “dose” of the intervention. A total of 11 (14%) of the AIP subjects died, 9 (12%) were admitted to nursing homes, 6 (8%) moved, and 5 (6%) moved during the study period. Reason for disenrollment in the nursing home group was not available. There was no statistically significant relationship between initial ADL score ($p = 0.95$) or initial CPS score ($p = 0.42$) and the point at which an individual left the study.

The AIP group had significantly better clinical outcomes in ADLs, cognition, depression and incontinence at least one time period (Table 2). Cognition was significantly better at six, twelve, and eighteen months. Depression, however, was significantly better (less depressed) at 6 and 12 months. ADL functioning was better than the nursing home group at all but the 18 month measurement period. At baseline the AIP group had a significantly higher incidence of incontinence, however at the remaining time periods the nursing home group had a higher incidence of incontinence with a statistically higher incidence at 24 months. There were insufficient numbers of subjects with pressure ulcers, so group differences for this clinical outcome could not be analyzed. In the remaining four outcome measures the AIP group stabilized or improved outcome scores while the nursing home group’s outcome scores deteriorated (Figure 1).

Discussion

The results of this study are supportive of the use of community-based care for some older adults in need of long term care services. The decision to move to a nursing home is complex and influenced by many factors (Castle, 2003; Forbes, Hoffart, & Redford, 1997; Grando et al., 2002). However, little data is available regarding clinical outcomes if one chooses to remain in one’s home with community-based services versus institutionalization. The majority

of cost comparison studies operate from the assumption that care is similar in both settings (Lee, 2000). The difference in clinical outcomes between nursing home and Aging in Place clients suggests that care outcomes may not be similar in both settings. Further research is needed to understand the effect of both the type or process of care delivered as well as the physical environment where care is delivered.

Declining ADL and cognitive functioning are two major factors related to institutionalization of older adults (Miller & Weissert, 2000). Postponing decline in both of these areas enables the older adult to remain at a less intensive level of care. However, compared to the study by Frytak et al. (2000) where assisted living and nursing home residents had similar outcome trajectories, the persons in the AIP program had more positive outcome trajectories when compared to nursing home residents. Also, in the Frytak et al. study assisted living and nursing home residents were not matched on ADL functioning at baseline.

Cognitive function and mental illness are dynamically linked to decline in physical functioning (Leveille et al., 1998). It is interesting that ADL, cognitive status, and depression improved and then declined at a slower rate in the AIP group as compared to the nursing home comparison group. One explanation could be that staying in ones home and maintaining independence contributes to the more positive outcomes.

Coordination between acute and long term care systems prevents frail older adults from falling through the cracks, however, Medicaid does not usually reimburse for this care. Using the same providers for post acute home health care and chronic illness care provides an enhanced level of community-based care. Similar to institutional care where nursing care is required, AIP provides nursing care to facilitate communication and implementation of the older adult's health care plan.

Most state Medicaid programs do not reimburse for the extra care required to coordinate care. However, several states have initiated capitated systems for Medicaid payment for long term care services (Stevenson, Murtaugh, Feldman, & Oberlink, et al. 2000). The Arizona Long Term Care System (ALTCS) emphasizes HCBS, with incentives to avoid institutional placement. ALTCS has decreased the states Medicaid expenditures on long term care by 16% and lowered the growth rate. Other programs such as Programs for All-Inclusive Care for the Elderly (PACE) and the Social HMO (S/HMO) initiatives have demonstrated limited financial savings with the capitation of both Medicare and Medicaid funds. Each of these programs has an increased level of care coordination, however, studies on clinical outcomes by site of care is missing. The main question is: “Are states saving money at the price of poor quality care?”. Without quality evaluation components to program evaluation this question cannot be answered.

There are several methodological issues that require comment. The individual matching strategy was chosen to ensure that subjects in the two groups were comparable at baseline. This previously has been shown to result in covariate balancing similar to complete randomization (Inouye et al., 1999; Tinetti et al., 2002). Without randomization there is less confidence that subjects were similar since we never know all the variables to match on. However, the results of the study provide essential information for future randomized trials.

A total of 82% of the AIP participants were matched to nursing home residents within or near the AIP service area. Since enrollment was over a 33 month period, the largest number of subjects was available for the 6 month time period. A larger study that followed all subjects for a 24 month period would provide more insight into attrition rates of the community population. Because the AIP program was conducted in only one agency it cannot be generalized to all HCBS clients. However, using one agency provided control over implementation of an intervention that is organizationally based. Results from this study will provide direction for

future HCBS programs. The MDS data was obtained by nurses providing clinical care which could raise the possibility of biased reporting. However, the MDS has a history of use for clinical and research purposes and has demonstrated reliable findings attributed to the use of a standardized clinical assessment instrument (Mor, 2004).

Cost analysis was beyond the scope of the completed study. Medicare and Medicaid claims data will be examined in future analysis to determine the impact of Aging in Place on the overall cost of health care for the study participants. If health care costs are similar or, better yet, lower than those of the comparison group, then Aging in Place will have promise as a viable alternative to the current fragmented system of long term care.

This study demonstrated that participants of the Aging in Place program had favorable clinical outcomes when compared to similar individuals receiving long term care in a nursing home. Unique to this study was that the nursing home comparison group was matched to the Aging in Place group. This prevented baseline differences in the groups, a problem identified in the majority of community-based care evaluations. Development of a standardized assessment similar to the MDS for HCBS clients is encouraged. Without such an assessment, quality comparison across sites will not be possible. The Aging in Place program shows promise as a viable option for frail older adults in need of long term care.

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Table 1 Demographics by Group

<i>Variable</i>	<i>AIP n=78</i>	<i>Nursing Home n=78</i>
Age (mean \pm SD)	72.0 (\pm 10.9)	72.2 (\pm 10.6)
Gender (% female)	55 (71)	53 (68)
Race/Ethnicity (%)		
Black	19 (27)	3 (4)
White	50 (72)	74 (95)
Hispanic	0 (0)	0 (0)
Other	1 (1)	1 (1)
Marital Status (%)		
Married	8 (10)	16 (21)
Widowed	35 (45)	33 (42)
Divorced/Separated	23 (29)	21 (27)
Never Married	12 (15)	8 (10)

Table 2 Outcome by Group by Time Period

Cognition	AIP				NH				p value
Time Period	n	Mean	SD	Median	n	Mean	SD	Median	
Baseline	78	0.9	1.0	1.0	78	1.2	1.2	1.0	na*
6 months	69	0.8	1.0	0.0	73	1.4	1.4	1.0	0.00
12 months	61	0.7	1.0	0.0	62	1.8	1.6	1.5	0.00
18 months	38	0.6	1.0	0.0	40	1.8	1.7	1.5	0.00
24 months	16	0.8	1.1	0.0	26	2.1	1.9	2.5	0.38

*subjects matched on admission CPS score

Depression	AIP				NH				p value
Time Period	n	Mean	SD	Median	n	Mean	SD	Median	
Baseline	78	0.7	1.1	0.0	78	1.1	1.9	0.0	0.76*
6 months	69	0.5	0.9	0.0	73	1.4	2.0	0.0	0.00
12 months	61	0.3	0.6	0.0	62	1.5	1.9	1.0	0.00
18 months	38	0.5	0.9	0.0	40	1.4	2.6	0.0	0.14
24 months	16	0.4	0.7	0.0	26	1.3	2.1	0.0	0.39

*Wilcoxin rank sum test

ADLs	AIP				NH				p value
Time Period	n	Mean	SD	Median	n	Mean	SD	Median	
Baseline	78	1.7	3.6	0.0	78	2.1	3.6	1.0	na*
6 months	69	1.3	3.2	0.0	73	3.2	4.9	1.0	0.02
12 months	61	1.7	3.9	0.0	62	3.5	5.3	1.0	0.04
18 months	38	1.4	3.7	0.0	40	3.8	4.6	2.0	0.08
24 months	16	0.8	2.2	0.0	26	3.2	5.2	1.0	0.00

*subjects matched on admission ADL

Incontinence	AIP				NH				p value
Time Period	n	Mean	SD	Median	n	Mean	SD	Median	
Baseline	78	1.0	1.5	0.0	78	0.5	0.9	0.0	0.03*
6 months	69	0.8	1.3	0.0	73	0.8	1.2	0.0	0.12
12 months	61	0.8	1.4	0.0	62	0.9	1.3	0.0	0.21
18 months	38	1.0	1.4	0.0	40	0.9	1.3	0.0	0.28
24 months	16	0.6	1.1	0.0	26	1.1	1.4	0.0	0.02

*Wilcoxin rank sum test

Figure 1 Outcome Trajectory Comparison by Group.

