Functional Improvement of Elderly Residents of Institutions

Dror Walk, Rachel Fleishman, and Jenny Mandelson

The health and functional ability of an older person decline with age. This is confirmed by many studies that indicate the older the study sample, the higher the rate of morbidity and the greater the difficulty in functioning (National Center for Health Statistics, 1987). Nevertheless, not all elderly persons experience a steady functional decline, and a lot who have previously had difficulty carrying out daily activities regain their ability with time.

Functional disability of elderly persons is usually measured by activities of daily living (ADLs) that are essential for independent self-care, such as eating and bathing. There are various definitions of ADL disability: having difficulty performing an activity, inability to perform an activity, or needing assistance to perform the activity. This variety of definitions can affect the distribution of ADL disability in different studies (Lazaridis, Rudberg, Furner, & Cassel, 1994).

Most studies of functional change use indices that sum up several ADL activities, but do not examine change in specific activities. In a statewide Massachusetts sample of 1,317 elderly persons, one quarter of those who experienced ADL limitations during the baseline assessment showed improvement in a four-activity ADL summary index 15 months later (Branch, Katz, Kniepmann, & Papsidero, 1984). Manton (1988) examined functional status among a representative sample of 20,485 participants in the National Long-Term Care Survey (NLTCS). Grouping his sample by the number of affected ADL activities in the baseline assessment, he found functional improvement between 1982 and 1984 in at least one activity among 18.2–23.6% of the sample, depending on the number of activities in which there was impairment at the baseline measurement. Analysis of the third wave of the NLTCS revealed improvement between 1984–1989 among 8.9–12.3% of the sample (Manton, Corder, & Stallard, 1993).

The use of a summary index of ADLs is indeed simple and compact. However, its general nature does not provide a functional profile of the elders assessed, thus making it difficult to suggest specific modes of intervention. Stark, Kane, Kane, and Finch (1995) employed a sophisticated summary index in which various levels of dependence in seven ADLs were weighted. Full dependence in eating, for example, was assigned 971 points, and full dependence in bathing, 500 points (Finch, Kane, & Philip, 1994). They found that 35% of the elderly persons in nursing institutions showed an improvement in functioning between two assessments taken on an average of 10 months apart. Compared to simple summary indices, the use of this index offers far better statistical possibilities due to the wide range of values (0–5,431) it provides. However, the strength of this index is also its weakness: Its complexity hinders intuitive understanding of its values. It may not be easy to imagine an elderly person having difficulty with three out of seven activities, but try imagining a person with 2,873 dependency points!

A number of researchers have recognized the problem inherent in a summary index of ADLs and have suggested that specific ADLs should be analyzed. For example, Crimmins and Saito (1993) suggest that instead of relying solely on a summary index, change in...
specific activities, as well as their relation to overall functional change, should be analyzed. This approach was employed for a subsample of 3,169 elderly persons residing in the community who participated in the first two waves (1984 and 1986) of the Longitudinal Study on Aging (LSOA). Improvement was found in eating among 60.4% of the elders, in bathing among 37.4% of the elders, and in mobility among 31.1% of the elders (see also, Wolinsky, Stump, Callahan, & Johnson, 1996).

It seems that using specific ADLs to assess functional change has advantages over the widely used summary indices. It provides a more meaningful and constructive understanding of the process and generates information that may be useful not only for scientific conceptualization but also for practical caregiving.

To date, the decisive majority of studies have examined functional improvement only among elderly persons residing in the community. However, some of those residing in the community at the time of the baseline measurement are later institutionalized. Studies have addressed these elders in various ways.

Some studies exclude elderly persons who no longer reside in the community at the time of the follow-up measurement, including those who have been institutionalized (e.g., Crimmins & Saito, 1993; Wolinsky et al., 1996). Others treat institutionalization as an outcome measure, their view being that it is the result of functional decline (Manton, 1988; Strawbridge, Kaplan, Camacho, & Cohen, 1992). Boaz (1994) is an exception. In her analysis of the NLTC 1982 wave, she prefers to include institutionalized elders, remarking that a person might reside in an institution for reasons other than functional decline. Nevertheless, neither approach treats institutionalized elders as a distinct group, and neither considers their special characteristics.

Distinct reference to institutionalized elderly persons can be found in Stark and colleagues (1995), who compared functional change among elderly residents of adult foster care (AFC) with that among elderly residents of nursing homes. Similarly, Gerrard and colleagues (1990) examined the impact of geriatric nurse practitioners on nursing home residents’ functional status at four points of time. However, neither study described the institutional surroundings nor suggested institutional variables that could explain functional change.

Indeed, separate study of functional improvement of institutionalized elderly persons is of value due to the unique nature of institutional living compared to living in the community. On the one hand, an institution’s population is generally composed of elderly persons who can no longer live in the community due to functional decline. Consequently, one would not expect a high rate of functional improvement. On the other hand, the institution offers a rehabilitative environment with structured treatment and trained staff, enhancing the chances of functional improvement.

In this article, we shall present an analysis of functional improvement among residents of institutions for semi-independent and frail elders in Israel by specifically examining four ADLs—bathing, eating, bladder continence, and mobility. We shall explain the probability of functional improvement using three types of variables: demographic, functional, and institutional. Reference to institutionalized elders and the use of specific ADLs are the unique contribution of this article.

Method

Data

The data used in this analysis were gathered from 1986 to 1995 in the course of government regulation of institutions for semi-independent and frail elders in Israel. This article compares the functional variables recorded for each resident during two periods: 1986–1992 (baseline) and 1989–1995 (follow-up).

Beginning in 1986 on an experimental basis, and from 1993 on a routine basis, government surveillance of institutions for semi-independent and frail elders in Israel was conducted according to the RAF Method (for Regulation, Assessment, Follow-up and continuous improvement of quality of care) developed at the JDC-Brookdale Institute (Fleishman et al., 1994). The RAF Method is based on the tracer approach (Kessner & Kalk, 1973) and on principles of quality assurance (Donabedian, 1991). According to the RAF Method, regulation is based on a surveillance cycle lasting between 1 and 2 years. Surveillance is conducted by a social worker surveyor and a nurse surveyor from the Service for the Aged in the Ministry of Labor and Social Affairs. The surveillance cycle is composed of a comprehensive inspection visit used for identifying deficiencies, formulation of a plan to correct them, and follow-up visits during which corrections are examined. Deficiencies are found by cross-referencing a number of sources of information, including the elderly residents themselves. For this purpose, interviews are conducted with a sample of residents. In order to determine a representative sample, as well as to establish a national database to be used in policymaking, demographic and functional data on each resident are gathered at the beginning of the surveillance cycle. The sources of these data are the administrative records and the biannual functional assessments routinely conducted by the attending nurses (Fleishman, 1995).

As regulation according to the RAF Method was implemented at first experimentally, and only after 5 years as a matter of routine, institutions came under this new regulatory method gradually. Moreover, institutions are inspected at different times, according to a yearly work plan, and not within a limited time, as in the case of a standard study. In addition, varying periods of time elapse at different institutions between baseline functional measurements and follow-up measurements, due to differences in the work patterns of surveyors and in the operational patterns of the institutions. Thus, unlike most longitudinal studies, baseline and follow-up data for this analysis were not gathered at fixed points in time; rather, the baseline data were amassed over the course of 6 years, whereas the follow-up data were gathered between 2 and 4 years after baseline data. To manage this departure from longitudinal study norms, statistical control was
exercised over the calendar dates of the baseline data, and over the time that elapsed until collection of the follow-up data.

Although most studies using ADL measures are based on data gathered by interviewing elderly persons, the data used in this analysis were gathered from standardized functional assessments made by registered nurses every 6 months. Examination of the credibility of these two sources indicated no distinct advantage to either (Boult, Kane, Louis, Boult, & McCaffrey, 1994). Yet it appears that professional assessments are superior in light of criticism by Mathiowitz and Lair, as cited by Boaz (1994, p. 600). According to Mathiowitz and Lair, the functional improvement reported in the literature is actually the result of panel conditioning—that is, elderly persons who reported having difficulties during the baseline measurement, report having no difficulties during the follow-up measurement in order to avoid further questioning by the interviewer. This type of bias is not likely when the information is based on professional assessment. Although the functional data used in this study were gathered by the institutions' nurses and not by independent nurses, this does not seem to bias the data because these data are not used by the governmental surveillance system to evaluate the quality of the institution, but for policy formulation and needs projection.

Sample

We included in the analysis a total of 2,527 residents of 54 institutions for whom there were data from at least three waves of assessment. For this study, we considered the first wave the baseline assessment and the third wave the follow-up assessment. We did not include residents for whom there were data from only two waves because of the relatively short time lapse between assessments (M = 1.5 years). Similarly, we included in this analysis only those residents for whom the time lapse between the first and third assessments was from 2 to 4 years; this was to maintain time-lapse parity with most of the studies so far conducted (e.g., Crimmins & Saito, 1993; Wolinsky et al., 1996). For these 2,527 residents, the average time lapse between the first and the third assessments was 2.8.

At the time of the baseline assessment, 11.8% of the residents were aged 65–74; 55.7% were aged 75–84; and 32.5% were aged 85 and older. The average age was 81.6. The average length of institutional residency was 3.6 years. Women comprised 73.6% of the sample.

Design and Variables

The data analysis first presents the functional change in four ADLs among the elderly persons between two points in time. Then, using logistic regression, we predict the probability of functional improvement for those elderly persons who were dependent at the baseline assessment (Point A).

The predicted variable was defined as functional status at the follow-up assessment (Point B) in performing each of the following activities: (a) bathing, (b) eating, (c) bladder continence, and (d) mobility. Because this study examined only those elderly persons who were dependent at Point A, the categories for this variable were either that functional status improved or did not improve between Point A and Point B.

The predicting variables were of three types:

1. Demographic: Gender and age. Age was divided into three categories: 65–74, 75–84, and 85 and older.
2. Functional: Two variables related to the functional change. These were the number of ADLs in which the resident showed functional improvement; and the number of ADLs in which the resident showed functional decline. Both variables run from 0 to 3, denoting the exclusion of the ADL being analyzed.
3. Institutional: The first variable was the length of time the elderly person had been residing at the institution. The values were divided into short stay for those whose duration of residency was average (M = 3.6 years) or shorter than average, and long stay for those residing at the institution for a longer than average duration. The second variable was the institutional quality of care according to the governmental surveillance findings collected at Point A. Each institution received a rating (ranging from 0 to 100) based on the number of deficient items divided by the number of items examined during the inspection visit. An institution whose deficiency rating was average or below average was considered for the purpose of this analysis to offer higher quality care, whereas an institution with an above average deficiency rating was considered to provide lower quality care. In addition, the chronological date of Point A was statistically controlled, as was the time lapse between Point A and Point B.

Results

The basic findings confirmed the accepted viewpoint of longitudinal functional decline among elderly residents (see Figure 1). Aside from eating—for which there was a negligible difference between Point A and Point B in the percentage of the dependent elders—there was an increase in the percentage of the dependent elders with bathing (36.3% and 57.2%, respectively), bladder continence (10.9% and 21.9%, respectively), and mobility (15.9% and 26.0%, respectively) at Point B (p < .001 in t tests for paired samples).

Data in Figure 1 are presented as a cross-sectional model for which the percentage of dependent residents is given for Point A and Point B. Because the model's latent assumption that functional dependence at Point A is permanent, and therefore will exist at Point B, it is difficult to perceive individual patterns of change over time (Branch & Leighton, 1989). Similarly, cross-sectional perspective underestimates change over time (Branch & Stuart, 1985). To clarify the phenomenon of functional change at the individual level, we divided the elders into four categories of change: (a) Those who were not dependent at either point in

722
time; (b) those who were dependent at both points in time; (c) those who were not dependent at Point A but were dependent at Point B (meaning there had been a functional decline); and (d) those who were dependent at Point A but were not dependent at Point B (meaning there had been a functional improvement).

Figures 2–5 describe the elderly residents' functional status at two points in time for each of the four ADLs. This allows us to focus on the individual by distinguishing between those who improved and those who deteriorated.

Because this article is concerned with functional improvement, it will focus on analyzing those elderly persons who were dependent at Point A in each of the four ADLs analyzed here: bathing, eating, bladder continence, and mobility. Of the elderly residents who were dependent in bathing at Point A, 8.0% were not dependent at Point B. The percentage of residents experiencing functional improvement in the remaining ADLs were: 52.0% for eating; 34.1% for bladder continence; and 30.3% for mobility.

Logistic regression analyses for each of the four ADLs indicated that each was differentially affected by the three types of predicting variables: demographic, functional, and institutional (see Table 1).

For bathing, demographic, functional, and institutional variables influenced the probability of functional improvement. The probability of improvement was greater for men than for women; it also increased as the number of remaining ADLs showing functional improvement increased, and as the number of remaining ADLs showing functional decline decreased. In addition, the probability of improvement was higher for the short stay residents. There was also a higher probability of improvement for those residing at institutions offering a higher quality of care.

For eating, only institutional variables influenced the probability of functional improvement, and only moderately. The probability of improvement was higher for the short stay residents and for those residing at institutions offering higher quality of care.

For bladder continence, only the institutional variable of quality of care influenced the probability of functional improvement, but in a dramatic fashion. For those residing at institutions offering a higher quality of care, the probability of improvement was over six times greater than for those residing at institutions offering a lower quality of care.

For mobility, both functional and institutional variables influenced the probability of functional improvement. The probability of improvement increased as the number of remaining ADLs showing functional improvement increased, and as the number of remaining ADLs showing functional decline decreased. In addition, the probability of improvement was higher for the short stay residents.

Discussion

Although the functioning of elderly persons generally declines as they age, there are those for whom decline is only temporary and functioning improves with time. Previous studies have already confirmed this phenomenon among the elders residing in the com-
Figure 2. Bathing: Changes in dependence between Point A and Point B among institution residents (N = 2,527).

Figure 3. Eating: Changes in dependence between Point A and Point B among institution residents (N = 2,527).
Figure 4. Bladder continence: Changes in dependence between Point A and Point B among institution residents (N = 2,527).

Figure 5. Mobility: Changes in dependence between Point A and Point B among institution residents (N = 2,527).
community. The current study establishes this regarding the elders residing in institutions.

Our findings confirm those of others, which indicate that ADLs have a certain order. Katz, Ford, Moskowitz, Jackson, and Jaffe (1963) were the first to suggest an index based on a hierarchical order of ADL activities. In other words, it appears that an elderly person who can perform a particular function without assistance can generally also perform those ranked below it. Similarly, an elderly person improves functioning in the same hierarchical pattern. The order of improvement for the four activities in our study is: eating, bladder continence, mobility, and bathing (the same order found by Katz and colleagues [1963]).

It would seem that compared with eating, restoring independent bathing, mobility, and bladder continence is related heavily to institutional costs. Furthermore, maintaining independence of those improved functions among institution residents requires ongoing monitoring and care. Specifically, bathing and mobility entail certain risks for the elderly person; therefore, extra manpower allocation is needed. Control of bladder continence depends on skilled and trained personnel. By way of contrast, restoring independent eating does not necessarily require a great investment in staff, and once achieved reduces staff investment. It is noteworthy that Katz and colleagues' (1963) hierarchy is kept despite the restricted conditions in the institution, which could interfere with the natural process of functional decline and improvement. Actually, the organizational nature of the institutions is compatible with the neurological mechanisms responsible for that hierarchy.

This study found less improvement in bathing than did other studies of elderly persons residing in the community: 8% versus about 30% (Crimmins & Saito, 1993; Wolinsky et al., 1996). This might reflect institutions’ hesitancy to encourage independent bathing because of safety risks and economic costs.

The importance of demographic characteristics—age and gender—is marginal for all four ADLs. No consistent effect of demographic variables is cited in the literature. Crimmins and Saito (1993) report on the lack of influence of age on functional improvement. Palmore, Nowlin, and Wang (1985) report that the age of an elderly person is a predictor of functional change. However, they do not distinguish between functional improvement and functional decline. Still, support for the argument that age does not affect functional improvement but does affect functional decline can be found in the study by Boaz (1994).

In light of the lack of effect that demographic variables have on functional improvement in this study, it is interesting to note that in bathing, men have a slightly higher probability of improvement than women. It appears that the act of bathing requires more physical resources than any other ADL, and it is possible that among the elderly population, these resources are to be found more in men than in women. A hint of this can be found in Crimmins and Saito (1993), who did not discover a difference between men and women in the percentage of improvement in ADLs but did find that men have an advantage in activities of the wider world (AWW), particularly those relevant to bathing, such as stooping, crouching, kneeling, and reaching up over the head.

We found that the functional variables have a differential effect on specific ADLs. The probability of improvement in bathing and mobility increases as the number of other ADLs showing improvement increases, and the number of other ADLs showing deterioration decreases. However, these functional variables had no such effect on eating or bladder continence. The reason might be related to the hierarchy of daily activities that was mentioned above. Eating and bladder continence are the last ADLs to decline, while bathing and mobility are among the first to decline (Katz

<table>
<thead>
<tr>
<th>Variable</th>
<th>Bathing</th>
<th>Eating</th>
<th>Bladder Continence</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (ref. 85+)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65-74</td>
<td>1.05</td>
<td>.70</td>
<td>2.45</td>
<td>.97</td>
</tr>
<tr>
<td>75-84</td>
<td>1.02</td>
<td>.83</td>
<td>1.05</td>
<td>.97</td>
</tr>
<tr>
<td>Gender (ref. female)</td>
<td>1.66*</td>
<td>1.27</td>
<td>1.07</td>
<td>.66</td>
</tr>
<tr>
<td>Functional</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of activities in which there was improvement</td>
<td>1.65**</td>
<td>1.36</td>
<td>1.18</td>
<td>1.78**</td>
</tr>
<tr>
<td>Number of activities in which there was a decline</td>
<td>.40***</td>
<td>1.05</td>
<td>1.00</td>
<td>.59***</td>
</tr>
<tr>
<td>Institutional</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of stay (ref. short stay)</td>
<td>.61*</td>
<td>.74*</td>
<td>.75</td>
<td>.52**</td>
</tr>
<tr>
<td>Quality of care (ref. lower quality)</td>
<td>1.72*</td>
<td>1.45*</td>
<td>6.23***</td>
<td>1.22</td>
</tr>
<tr>
<td>Model $\chi^2$ (df = 9*)</td>
<td>806.23***</td>
<td>36.63***</td>
<td>73.82***</td>
<td>94.45***</td>
</tr>
</tbody>
</table>

aN = 917 dependent residents at Point A.
N = 758 dependent residents at Point A.
**N = 276 dependent residents at Point A.
NN = 402 dependent residents at Point A.
*The model tests the null hypothesis that the coefficients for all of the independent variables are 0.
*p < .05; **p < .01; ***p < .001.

Table 1. Logistic Regression Odds of Functional Improvement by Demographic, Functional, and Institutional Variables
We might thus expect that an elderly person who is no longer independent in eating or bladder continence would also not be independent in bathing and mobility. In such a situation, the functional variables of the number of other activities in which there was a decline or improvement has a low variance, hence limited strength in predicting functional improvement.

We found that institutional variables also have a differential effect on specific ADLs. Length of residency in an institution appears to be a predictor of functional improvement in bathing, eating, and mobility, though not in bladder continence. For these three activities, the probability of improvement is higher for short stay residents than for long stay residents.

Even if we do not accept Goffman’s (1961, p. 6) conceptualization of the “total institution” as a place where all of the resident’s needs are met without differentiation, it is clear that institutionalization is characterized by a substantial decline in personal autonomy. Unfortunately, institutions are too often insensitive to their residents’ need for control over their lives. Indeed, residents’ dependency promotes the institution’s efficiency, but may weaken the already frail residents (Seligman, 1975).

The relation between loss of autonomy and functional decline is explained by the model of “learned helplessness” developed by Seligman (1975, p. 23). According to this model, an individual’s loss of control and inability to predict his situation lead, via psychological and physiological mediators, to functional decline and morbidity (Rodin & Langer, 1977). It is no wonder, then, that an extended stay at an institution may lead to deterioration in the elderly person’s capabilities, reducing his chances of functional improvement.

However, the other institutional variable—quality of care—affords a different view of the institution’s role in improving the functioning of the resident. There is a greater probability of functional improvement for bathing, eating, and bladder continence, though not for mobility, at institutions offering higher quality of care. The probability of improvement in bladder continence is particularly striking. Indeed, this activity can be improved through the use of advanced techniques. For example, following implementation of a program based on prompted voiding, Schnelle and colleagues (1993) reported an improvement in 50% of the residents suffering from loss of bladder continence. The importance of the institution in improving this activity is emphasized by the reports that functional improvement vanishes when institution staff fail to maintain a necessary level of intervention (Burgio et al., 1990).

The institutional variables, quality of care and length of stay, reflect the divergent nature of the institution’s impact on the resident’s functioning: rehabilitation versus deterioration. On the one hand, the institution with its trained caregiving staff and nursing equipment can facilitate functional improvement; on the other, the institution can deprive the resident of autonomy, leading to functional decline. As deterioration can be by default a consequence of institutionalization, an institution must actively implement intervention programs to prevent functional decline and enhance functional improvement.

Conclusions

This article has enriched the discussion of functional improvement of elderly persons by focusing on institutionalized elders and by analyzing specific ADL activities. The findings show functional improvement also among these elders.

Reports in the literature concerning functional improvement that do not specify the findings for each ADL are of limited value. They arouse interest at the scientific and conceptual level but do not provide the basis for understanding the processes related to improvement, nor do they propose intervention programs to encourage improvement. The findings of the current work, which uncover differing patterns of improvement among ADLs and the different variables affecting each, confirm the importance of analyzing ADLs individually.

The hierarchical order of the ADLs was also confirmed in the institutional environment. Therefore, intervention programs should be implemented according to this hierarchy of functional improvement. For example, an elderly resident who needs assistance in eating should not be encouraged to bathe himself before he has regained the prior functions in the hierarchy.

This study reveals that the institutional setting can act as an agent of either improvement or decline. To act as an improvement agent, staff should be trained to encourage residents to develop independence and to foster a sense of control over their lives. This approach must be taken despite the risks to residents and costs to institutions, otherwise deterioration is inevitable.

References


Gerrard, J., Kane, R. L., Radosевич, D. M., Skay, C. L., Arnold, S., Keplerle,
The Sociology Program at Coastal Carolina University invites applications for an Assistant Professor, tenure track position beginning August 2000. The successful candidate will have a Ph.D. in Sociology, research expertise in Social Gerontology, a demonstrated interest in undergraduate teaching and research, and will assist in helping to promote the Department’s Gerontology Certificate Program.

Applicants should send vitae, statements of teaching and research interests, copies of transcripts, and three (3) letters of reference. Coastal Carolina University is a growing, state-assisted institution located 10 miles from Myrtle Beach. Consult our web page at http://www.coastal.edu. Send application to Chair, Sociology Search Committee, Coastal Carolina University, P.O. Box 261964, Conway, SC 29528. Review of candidates will begin immediately and continue until the position is filled. Coastal Carolina University is committed to Equal Employment Opportunity and is eager to identify minority persons and/or women with appropriate qualifications.

Fellowship in Mental Health Services Research

The Centers for Mental Healthcare Research at the University of Arkansas for Medical Sciences offers VA- and NIMH-sponsored fellowships in mental health services research. The training program is designed to prepare Ph.D. and M.D. fellows for independent investigation in the areas of access, utilization, quality of care, outcomes assessment and cost effectiveness. Centers research is concentrated in five clinical areas: dementia, depression, schizophrenia, substance abuse and comorbidity. Annual stipends are $36,000. Supplemental funding is made available for research ($7,000) and travel expenses ($1,000). Applicants are requested to submit (1) a current curriculum vitae; (2) a brief overview of their areas of research interest, short-term (fellowship) objectives and long-term (career) goals; and (3) three letters of recommendation. To be eligible, an individual must be a United States citizen. Both the Department of Veterans Affairs and the University of Arkansas are Equal Opportunity Employers. For further information please contact John Fortney, Ph.D., VA HSR&D CeMHOR (152/NLR), 2200 Fort Roots Drive, North Little Rock, AR 72114. telephone: (501) 257-1727; email: fortneyjohn@exchange.uams.edu

Received April 21, 1998
Accepted August 6, 1999