Self-Rated Health and Physical Disability in Elderly Survivors of a Major Medical Event

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This article describes change and stability in self-rated health after a major medical event. Using a prospective design, it examines the ability of premorbid and post-illness health perceptions to predict physical disability independently of medical, psychosocial, and behavioral variables. Participants (N = 254) were a subsample of the New Haven cohort of the Established Populations for Epidemiologic Studies of the Elderly (EPESE) project who had survived hospitalization for stroke, myocardial infarction, or hip fracture. Data came from premorbid EPESE interviews, medical records, and interviews at 6 weeks and at 6 months after hospitalization. Health perceptions did not universally decline after the illness. Self-rated health at 6 weeks predicted disability at 6 months, but premorbid self-rated health did not, suggesting that illness-related changes in health perceptions influenced the recovery process. The effects of 6-week self-rated health on disability were independent of physical inactivity. The mechanisms by which health perceptions influence recovery are unclear.

INDIVIDUALS’ perceptions of their own health predict mortality, independently of a number of sociodemographic factors, health status indicators, disability, and health practices (Idler and Kasl, 1991; Idler, Kasl, and Lemke, 1990; Kaplan, Barell, and Lusky, 1988; Mossey and Shapiro, 1982; Rakowski, Mor, and Hiris, 1991; Rakowski and Wilcox, 1994; Wolinsky and Johnson, 1992). Despite the predictive value of these perceptions, gerontologists know little about how sensitive they are to illness or injury. Health perceptions are associated with other indicators of illness or injury, such as the number of chronic conditions (Boo et al., 1989; Connelly et al., 1989; Goldstein, Siegel, and Boyer, 1984), a history of hypertension (Zonderman, Leu, and Costa, 1986), a recent fall (Cwikel, Kaplan, and Barell, 1990), and functional impairment (Idler, 1993; Linn, Hunter, and Linn, 1980; Linn and Linn, 1980; Rakowski and Cryan, 1990). People with more negative health perceptions make more physician office visits, telephone physicians more often, spend more days in the hospital, and take more medication than their peers (Connelly et al., 1989; Linn and Linn, 1980; Mor et al., 1994).

Few studies have explicitly examined the impact of a major illness on the self-rated health of older people. One study (Mæland and Havik, 1988) found that myocardial infarction produced a decline in health perceptions that lasted as long as 3–5 years; however, premorbid health perceptions were assessed retrospectively. Another study (Goldstein, Siegel, and Boyer, 1984) reported that improvements in perceived health over a one-year period were positively associated with the number of acute illness episodes, but negatively associated with the number of bed disability days. Both of these studies assessed predominantly nonelderly samples. A study of adults aged 62 and over found that new illnesses, increased physician visits, and a worsening of pre-existing conditions were correlated with a decline in perceived health, independently of baseline illnesses, sociodemographic variables, and psychosocial factors (Rodin and McAvay, 1992). Further research examining how the health perceptions of older persons respond to illness may advance our understanding of why they predict mortality so well.

The association of health perceptions with mortality may reflect, at least in part, their influence on recovery from illness or injury. Health perceptions may influence a range of illness outcomes in addition to mortality. For example, return to work is more likely for cardiac patients whose health perceptions are positive (Garrity, 1973; Hiatt, Peglar, and Borgen, 1984; Mæland and Havik, 1987). For older people, the ability to perform activities of daily living is a more widely applicable recovery outcome and an important quality-of-life indicator. Some research suggests that health perceptions influence the course of disability in older people (Branch and Ku, 1989; Idler and Kasl, 1995; Kaplan et al., 1993; Mor et al., 1994), but this research has not specifically focused on recovery from illness.

The relationship between health perceptions and health outcomes can be viewed from two general perspectives. First, perceptions and outcomes may be related through a mutual relationship with some third factor that has not been adequately controlled in prior studies (Idler and Kasl, 1991). For example, health ratings may reflect information that is not included in objective health measures (Idler, 1993), such as perceptions of internal states, some life-style or health practices, mood, social influence processes, or family medical history. Second, health perceptions may represent a true psychosocial influence on health that is independent of health status controls. An optimistic attitude about one’s health may affect biological processes, either independently or through other psychosocial influences (Idler and Kasl, 1991).

This article has three major purposes: First, it tests the hypothesis that elderly persons’ health perceptions would decline after a serious medical event. Participants were part
of an ongoing longitudinal study and incurred a myocardial infarction (MI), stroke, or hip fracture during the study period; thus, premorbid health perceptions were assessed before the event rather than retrospectively after the event.

Second, this article prospectively examines the relationship between health perceptions and recovery of physical functioning, while controlling for prior functional status, comorbidity, illness severity, and several behavioral and psychosocial variables known to affect health. We were particularly interested in whether premorbid or post-event self-rated health would be more predictive of recovery. While premorbid health perceptions might influence individuals' pre-event health status, we expected that perceptions early in the recovery period would have a greater impact on long-term functioning.

Third, this article investigates whether the relationship between self-rated health and disability is independent of physical activity, depression, and social support. Physical activity plays a vital role in programs to rehabilitate elderly patients after stroke, hip fracture, and other disabling conditions (Brummel-Smith, 1990). Negative health perceptions are associated with low activity levels (Speake, Cowart, and Pellet, 1989; Yates, 1987) and thereby may lead to greater disability (Mor et al., 1989).

Depression has been associated with greater mortality (Bruce and Leaf, 1989), impaired recovery of physical functioning after hip fracture (Magaziner et al., 1990; Mossey et al., 1989), and poorer self-rated health (Blazer and Houpt, 1979; Rapp, Parisi, and Walsh, 1988; Weissman et al., 1983). A prospective study found that the ability of depression and anxiety to predict self-rated health after MI exceeded that of illness severity (Maeland and Havik, 1988). Thus, depression may be involved if health perceptions are found to influence recovery of physical functioning after illness. Social support may be related to self-rated health and to recovery of physical functioning. While several studies suggest that individuals with better support resources are less disabled after hospitalization (Cummings et al., 1988; Goodwin, Hunt, and Samet, 1991; Magaziner et al., 1990; Verbrugge, Reoma, and Gruber-Baldini, 1994; Wilcox, Kasl, and Berkman, 1994), others suggest that social contacts may not aid and may even impede recovery (Funch and Mettlin, 1982; Hyman, 1975; Mossey et al., 1989; Stephens et al., 1987). Similarly, inconclusive research indicates that the health perceptions of socially isolated individuals are either poorer or no worse than those of their socially connected peers (Blazer and Houpt, 1979; Hirdes and Forbes, 1993; Kaplan and Camacho, 1983; Lehr, 1983; Rodin and McAvay, 1992). While information about the relationship between social networks and health perceptions is sparse, even less is known about social support. Perceptions of poor health may lead people to seek support. Alternatively, social network members may be less supportive of individuals whose perceptions are negative, particularly if those perceptions are seen as unrealistic or hypochondriacal. This study focuses on the adequacy of task support, since previous research (Wilcox, Kasl, and Berkman, 1994) revealed that task support during the recovery period, not emotional support, predicted physical functioning 6 months after a major medical event.

This article examines health perceptions and disability in elderly persons who have experienced an MI, stroke, or hip fracture. These three medical conditions are among the most common potentially fatal illness events in the elderly, together accounting for 12% of all hospitalizations (Cornoni-Huntley et al., 1986). Hip fracture, stroke, and heart disease increase the risk of functional decline (Crimmins and Saito, 1993) and hence institutionalization (Foley et al., 1992; Wolinsky et al., 1993). The advantage of studying these acute events is that their time of onset can be precisely identified, unlike chronic conditions such as arthritis that have a gradual, indeterminate onset. This study complements prior research examining the relationship between health perceptions and mortality by focusing on disability in the survivors.

METHOD

The New Haven EPESE Cohort

This study is based on secondary analyses of data from the New Haven, Connecticut, cohort of the Established Populations for Epidemiologic Studies of the Elderly (EPESE) program. The purpose of EPESE is to identify risk factors for mortality, morbidity, institutionalization, and disability in older people (Cornoni-Huntley et al., 1986, 1993). The New Haven cohort at baseline consisted of 2,806 noninstitutionalized adults aged 65 and over recruited from a stratified probability sample; the strata were: public housing for elderly people, private housing for elderly people, and general community housing. Men were oversampled. The enumeration and sampling procedures have been previously described (Berkman et al., 1986; Cornoni-Huntley et al., 1993). The overall response rate was 82 percent.

The Recovery Study. — Admissions to the two New Haven hospitals were monitored from 1982–1988 to identify cohort members who received a discharge diagnosis of, and met standard criteria for, hip fracture, MI, or stroke. The two hospitals together account for 90 percent of all hospitalizations of the cohort. Eligible cohort members were recruited for a study of how older people recover from illness.

Procedure. — Baseline data came from interviews of the New Haven cohort, including in-person interviews in the respondent’s home in 1982 and 1985 and brief telephone interviews in 1983, 1984, 1986, and 1987. Sociodemographic data came from the 1982 baseline interview. Pre-illness health perceptions and physical disability were assessed annually; activities and smoking were assessed in 1982 and 1985. The data that most closely preceded the hospitalization served as the baseline measures.

Recovery Study interviews were conducted at 6 weeks and at 6 months after hospital admission in the respondent’s community or institutional residence. These interviews provided data on self-rated health, physical disability, social support, depression, and activities. Medical record abstracts summarized respondents’ medical condition, illness severity, and comorbidity.

Individuals who were, in the interviewer’s judgment, cognitively or physically unable to provide valid data were not interviewed; instead, a brief proxy interview was con-
dected. Proxies were not asked about health perceptions, depression, or the perceived quality of social support; therefore, proxy data are not included in analyses involving these variables.

**Measures**

Self-rated health was assessed by the standard item: "How would you rate your health at the present time?" Responses of "excellent," "good," "fair," "poor," and "bad" were coded 1-5, respectively.

Functional disability was assessed using the Activities of Daily Living (ADL) Scale, as developed by Katz and colleagues (Katz et al., 1970) and later modified (Branch et al., 1984). The Katz items have demonstrated good concurrent and predictive validity (Katz et al., 1970). The validity of the modified scale is supported by research demonstrating that the items predict both nursing home admission (Foley et al., 1994) and mortality (Guralnik et al., 1991). Furthermore, they are sensitive to the increased disability associated with aging, MI, hip fracture, and stroke (Cronin-Huntley et al., 1985, 1986; Wilcox, Kasl, and Berkman, 1994). The seven items ask whether respondents need help walking across a small room, bathing, grooming, dressing, eating, transferring, or toileting. Responses of "no help needed," "help needed," and "unable to do" were scored 1-3 and summed; higher scores indicate greater disability.

Control variables included sociodemographic factors (age, sex, race, education, and marital status), the number of comorbid conditions, and the severity of the medical event. A medical record abstractor recorded the presence of comorbid conditions based on notations made at the time of hospital admission. The checklist of primarily chronic conditions included, for example, angina, arthritis, glaucoma, and cancer. With respect to the event that prompted the hospitalization, the selection of severity measures was based on the advice of medical experts. Overall severity scores were calculated as described below and then standardized within condition to ensure comparability across event types. Greater severity was associated with a longer hospital stay, \( r = .19, p < .005, \) two-tailed.

For hip fracture, the type of fracture and surgical procedure are not good indicators of prognosis (Magaziner et al., 1990; Mossey et al., 1989). In contrast, early weight-bearing is associated with better post-fracture outcomes (Ceder, Thorgren, and Wallden, 1980), and may be restricted by the surgeon until it is likely to be well-tolerated. Consequently, hip fracture severity was assessed by the amount of weight-bearing recommended by the surgeon one week after surgery, with 1 = full, 2 = partial, and 3 = none.

Stroke severity was assessed by a scale that included bladder functioning, mental status, speech, and paralysis, four sequelae shown to be predictive of post-stroke functional status (Gladman, Harwood, and Barer, 1992; Taub et al., 1994). Bladder functioning was coded as 0 = continent, 1 = sometimes incontinent, and 2 = totally incontinent or catheterized. Mental status on admission was dichotomized, with 0 = clear or alert and 2 = some confusion to comatose. Speech was coded as 0 = adequate to limited speech, 1 = dysarthric, and 2 = aphasic. Paralysis was coded as 0 = absent or 1 = present. Scores on the four indicators were summed to form the scale (range 0-7).

The indicators of MI severity were heart failure and ejection fraction. The Killip scale (Killip and Kimball, 1967) was dichotomized into 0 = no heart failure and 1 = heart failure. Ejection fraction was coded as 0 = \( \geq 35\% \) and 1 = \(< 35\% \) or not done, since previous research (Berkman, Leo-Summers, and Horwitz, 1992) revealed higher mortality for MI patients whose ejection fraction had not been determined. The heart failure and ejection fraction measures were summed to derive a composite measure (range 0-2).

Behavioral and psychosocial variables included physical inactivity, smoking, depression, and task support. Physical inactivity was evaluated by four items asking whether respondents often, sometimes, or never participated in active sports or swimming, took walks, worked in the garden or yard, or did physical exercises. Premorbid interviews asked about the past month; Recovery Substudy interviews asked about the time "since your illness." Responses were scored 1-3 and summed; higher scores indicate less activity. The smoking variable classified individuals as either current or former smokers, or lifelong nonsmokers. Current depressive symptomatology was measured using the Center for Epidemiological Studies Depression Scale (CES-D) (Radloff, 1977), a 20-item scale shown to be reliable and valid for use with community-dwelling elderly (Berkman et al., 1986; Hertzog et al., 1990; Radloff, 1977).

To assess the adequacy of task support, interviewers asked respondents whether they could have used more assistance with daily tasks — such as grocery shopping, cooking, cleaning, transportation, and telephoning — since the illness than they received. Responses that they could have used "a lot," "some," or "a little more" assistance were coded as inadequate support, and contrasted with responses that the assistance received was adequate. This dichotomous treatment was necessary due to the skewed distribution, since most people reported adequate support. The task support measure has shown good convergent and discriminant validity (Seeman and Berkman, 1988).

**Subjects**

Individuals who had been admitted for one of the three medical events were asked to participate in the appropriate sub-study — either MI, stroke, or hip fracture. Those who were hospitalized more than once were recruited into more than one sub-study if the subsequent hospitalization was for a different type of event; for those 28 individuals, the data presented here are for the first hospitalization only. Of 417 individuals hospitalized, 108 had a hip fracture, 170 had an MI, and 139 had a stroke.

Individuals were excluded from analyses if they died in the hospital (\( n = 84 \)), before the 6-week interview (\( n = 24 \)), or before the 6-month interview (\( n = 34 \)). Additionally, survivors whose hospitalization was for more than one of the medical events of interest (\( n = 4 \)) were excluded because the focus of this study was on a single, well-defined event, and there were too few of these individuals to examine them statistically. Finally, 17 individuals lacked both a 6-week and a 6-month interview, usually because they refused to participate. The resulting sample consisted of 254 individuals.

Compared to sample members, excluded individuals were older (aged 76.9 vs 75.3, \( p < .05 \)), were more likely to be male (51.5% vs 37.4%, \( p < .01 \)), and were less educated (8.5 vs
9.2 years, \( p < .05 \), had more comorbid conditions (5.3 vs 4.6, \( p < .01 \)), and were less likely to have had a hip fracture (18.4\% vs 30.7\%) and more likely to have had a stroke (38.7\% vs 29.5\%) (\( p < .05 \) for type of medical event). The two groups did not differ in self-rated health, physical disability, or other variables at baseline.

Table 1 describes the 254 individuals in the final sample, which included 78 hip fracture cases, 75 stroke cases, and 101 MI cases. The 159 females and 95 males ranged from 65–97 years old (mean = 75 years). Despite their low levels of disability before the hospitalization, they reported little participation in physical activities. The number of comorbid conditions ranged from 0–11, with a mean of 5.

Not everyone in the final sample had complete data. Specifically, 28 people were missing one post-hospitalization interview, due to the 6-week interview time occurring before finalization of the questionnaires (\( n = 13 \)) or identification of the hospitalization (\( n = 3 \)), or due to refusal to be interviewed (\( n = 12 \)). For 24 people, one interview was by proxy (and therefore abbreviated) and the other by respondent; for 16, both interviews were by proxy. To maximize generalizability of results, these people are included in analyses that do not involve the missing data, causing the analysis sample size to vary.

Comparisons of sample members who had complete data with those who had missing values on one or more variables revealed that the two groups did not differ in most respects, including self-rated health, the number of comorbid conditions, premorbid disability, and illness severity. They were similar on all sociodemographic characteristics except age; those with some missing data were older (76.4 vs 74.2 years old, \( p < .05 \)). Participants with incomplete data reported greater disability at 6 weeks (score of 11.7 vs 9.7, \( p < .0001 \)) and 6 months (11.6 vs 9.5, \( p < .0001 \)), as well as higher levels of depression (15.9 vs 10.8, \( p < .01 \)) and inactivity (15.1 vs 10.4, \( p < .0005 \)) at 6 weeks.

RESULTS

The initial analyses assessed change and stability in self-rated health in relation to the medical event. Bivariate analyses explored the relationships between self-rated health, disability, and the other variables. The initial multivariate models examined the influence of both premorbid and 6-week self-rated health on 6-month disability, while controlling for sociodemographic characteristics, initial health status, and premorbid disability. Additional models investigated whether inactivity, depression, and task support could account for the association between self-rated health and disability.

Stability and Change in Self-Rated Health

As shown in Table 2, ratings of good or fair were endorsed by over three-fourths of the sample both before and after the hospitalization. A repeated-measures analysis of variance revealed no significant effects of time \( F(2,310) = 0.89, p > .05 \), type of event (hip fracture, stroke, or MI) \( F(2,155) = 1.97, p > .05 \), or their interaction \( F(4,310) = 0.93, p > .05 \). This unexpected finding led us to wonder whether the lack of overall significant effects of time obscured a great deal of individual variability, since correlations between self-ratings at any two times were only moderate (see Table 3).

To track individual variability, we calculated the percentage of respondents whose self-rated health improved, worsened, or remained the same for the entire sample and for strata defined by initial self-rated health, with the results displayed in Table 4. Ratings remained stable for about half of the sample from before the event to the 6-week follow-up.

Table 1. Distribution of Sample on Major Study Variables, \( N = 254 \)

<table>
<thead>
<tr>
<th>Variable</th>
<th>( % ) or Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Event</td>
<td></td>
</tr>
<tr>
<td>Hip fracture</td>
<td>30.7%</td>
</tr>
<tr>
<td>Stroke</td>
<td>29.5%</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>39.8%</td>
</tr>
<tr>
<td>Age (years)</td>
<td>75.3 ± 7.18</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>37.4%</td>
</tr>
<tr>
<td>Female</td>
<td>62.6%</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>81.3%</td>
</tr>
<tr>
<td>Black</td>
<td>15.5%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2.0%</td>
</tr>
<tr>
<td>Native American</td>
<td>0.4%</td>
</tr>
<tr>
<td>Unspecified Other</td>
<td>0.8%</td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>11th grade or less</td>
<td>67.2%</td>
</tr>
<tr>
<td>High school graduate</td>
<td>17.4%</td>
</tr>
<tr>
<td>Some college</td>
<td>15.3%</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
</tr>
<tr>
<td>Married, living with spouse</td>
<td>28.1%</td>
</tr>
<tr>
<td>Other</td>
<td>71.9%</td>
</tr>
<tr>
<td>Smoking History</td>
<td></td>
</tr>
<tr>
<td>Current smoker</td>
<td>20.2%</td>
</tr>
<tr>
<td>Former smoker</td>
<td>30.4%</td>
</tr>
<tr>
<td>Never smoked</td>
<td>49.4%</td>
</tr>
<tr>
<td>Number of Comorbid Conditions</td>
<td>4.65 ± 2.15</td>
</tr>
<tr>
<td>Premorbid Katz</td>
<td>7.74 ± 1.73</td>
</tr>
<tr>
<td>Premorbid Inactivity</td>
<td>10.3 ± 1.62</td>
</tr>
<tr>
<td>Premorbid Self-Rated Health</td>
<td>2.62 ± 0.79</td>
</tr>
<tr>
<td>6-Week Katz</td>
<td>10.56 ± 3.62</td>
</tr>
<tr>
<td>6-Week Inactivity</td>
<td>10.69 ± 1.34</td>
</tr>
<tr>
<td>6-Week CES-D Score</td>
<td>12.08 ± 10.63</td>
</tr>
<tr>
<td>6-Week Adequacy of Task Support</td>
<td>75.0%</td>
</tr>
<tr>
<td>Adequate</td>
<td></td>
</tr>
<tr>
<td>Inadequate</td>
<td>25.0%</td>
</tr>
<tr>
<td>6-Week Self-Rated Health</td>
<td>2.62 ± 0.89</td>
</tr>
<tr>
<td>6-Month Katz</td>
<td>10.46 ± 3.68</td>
</tr>
<tr>
<td>6-Month Self-Rated Health</td>
<td>2.57 ± 0.87</td>
</tr>
</tbody>
</table>

Table 2. Self-Rated Health Before, and at 6 Weeks and at 6 Months After a Major Medical Event

<table>
<thead>
<tr>
<th>Health Rating</th>
<th>At 6 Weeks ( n(%) )</th>
<th>At 6 Months ( n(%) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>6 (3.8%)</td>
<td>11 (7.0%)</td>
</tr>
<tr>
<td>Good</td>
<td>67 (42.4%)</td>
<td>71 (44.9%)</td>
</tr>
<tr>
<td>Fair</td>
<td>66 (41.8%)</td>
<td>58 (36.7%)</td>
</tr>
<tr>
<td>Poor</td>
<td>15 (9.5%)</td>
<td>12 (7.6%)</td>
</tr>
<tr>
<td>Bad</td>
<td>4 (2.5%)</td>
<td>6 (3.8%)</td>
</tr>
</tbody>
</table>

Note: This table includes only those for whom self-rated health data were available at all three time points, \( N = 158 \).
The ratings of 34.2% of respondents remained constant across all three time points. When change occurred, it was usually by only one level — i.e., from good to fair, or from fair to poor. Of those whose ratings changed between any two time points, change by only one level occurred among 74.4% from premorbid to 6 weeks, 78.3% from premorbid to 6 months, and 74.3% from 6 weeks to 6 months.

### Intercorrelations Among Study Variables

Gender was the only sociodemographic variable that was significantly correlated with health ratings (r’s from .15 to .17, p < .05, two-tailed); females reported poorer health than males. Table 3 shows the intercorrelations of the health ratings, disability, medical control variables, and the psychosocial and behavioral variables. A higher number of comorbid conditions was associated with poorer self-rated health; the correlations ranged from low to moderate. The severity of the medical event was unrelated to health ratings. In contrast, depression and inadequate task support were much more strongly related to negative health ratings, with the relationship between depression and health ratings particularly strong.

Severity of the event was associated with disability, particularly at 6 weeks. Individuals who, at 6 weeks, reported poorer self-rated health, greater inactivity, more depressive symptoms, and inadequate task support were more disabled at 6 months. Age and female gender were the only sociodemographic variables associated with 6-month disability (r = .21, p < .005, two-tailed, for both variables).

### Effects of Self-Rated Health on Disability: Multivariate Models

Hierarchical multiple regressions, summarized in Table 5, examined the effects of premorbid and 6-week health perceptions on 6-month disability, with potential confounding variables entered as blocks in a series of steps. Variables that, in the bivariate analyses, were related to either premorbid or 6-week self-rated health or to 6-month disability were
The high correlation between the two post-hospitalization to 6 months. Furthermore, self-rated health and disability at disability reports suggested only slight change from 6 weeks, which was not entered to avoid multicollinearity. Weeks was unlikely to produce spurious effects of 6-week self-rated health on 6-month disability.

Vealing that self-health at 6 weeks was an independent sociodemographic and health status control variables, repredicted disability in this or subsequent models. When premorbid health perceptions nor comorbid conditions pre

Premorbid ADL —.28*** .22** .22*

Psychosocial and Behavioral Factors
6-Week Inactivity — — .14* .19**
6-Week Depression — — .08 —
6-Week Task Support — — .11 —

Self-Rated Health (SRH)
Premorbid SRH .08 .03 .12 .03
6-Week SRH .18* .15* .05 .14*
Adjusted R² .38 .45 .48 .47
F 13.24*** 15.12*** 11.13*** 14.10***
(df) (8,149) (9,148) (12,119) (10,139)
N 158 158 132 150

Note: A dash indicates that the variable was not entered in that model.
*p < .05; **p < .01; ***p < .001.

included in the equations. The one exception was disability at 6 weeks, which was not entered to avoid multicollinearity. The high correlation between the two post-hospitalization disability reports suggested only slight change from 6 weeks to 6 months. Furthermore, self-rated health and disability at 6 weeks were not significantly correlated, suggesting that a cross-sectional relationship between the two variables at 6 weeks was unlikely to produce spurious effects of 6-week self-rated health on 6-month disability.

In Model 1, self-rated health was entered along with the sociodemographic and health status control variables, revealing that self-health at 6 weeks was an independent predictor of disability at 6 months. In contrast, neither premorbid health perceptions nor comorbid conditions predicted disability in this or subsequent models. When premorbid ADL functioning was added in Model 2, an association between age and 6-month disability emerged, but the predictive value of self-rated health remained.

Model 3 revealed that adding the psychosocial and behavioral variables eliminated the association between 6-week self-rated health and 6-month disability, suggesting that these variables may have been responsible for the association. Neither depression nor task support was an independent predictor of disability. However, inactivity at 6 weeks predicted greater disability at 6 months.

Subsequent analyses evaluated the ability of the individual psychosocial and behavioral variables to eliminate the association between self-rated health and disability. Model 4 showed that inactivity, when entered without depression and task support, was a significant predictor of 6-month disability, but could not by itself account for the effects of self-rated health. When depression and task support were separately entered instead of inactivity, each eliminated the ability of 6-week self-rated health to predict disability but was not itself a significant predictor.

Noting that the effective sample size decreased when the psychosocial and behavioral variables were added to the equation, we wondered whether decreased statistical power could explain the lack of significant effects of self-rated health. When Model 2 was repeated with only individuals who had complete data on these variables included, the effects of self-rated health were no longer significant.

Additional equations determined the proportion of variance explained by 6-week self-rated health and inactivity, over and above that explained by premorbid self-rated health, sociodemographic factors, the medical control variables, and premorbid disability. Self-rated health at 6 weeks independently explained 11.2% of the variance in 6-month disability; inactivity explained 2.1%.

To verify that cross-sectional relationships between disability at 6 weeks and other study variables did not influence the results, we retested Models 2–4 with disability at 6 weeks added in the same step with premorbid disability. The results showed some instability of the estimates for illness severity and premorbid disability. Nonetheless, self-rated health at 6 weeks continued to predict disability at 6 months, when inactivity but not depression and task support were entered. In addition, the ability of inactivity, measured at 6 weeks, to predict disability at 6 months was independent of disability at 6 weeks.

**DISCUSSION**

This study reveals that the health perceptions of elderly people respond in varied ways to a serious medical event. It is not surprising that some people would rate their health more poorly after such an event. However, the finding that about half the survivors would rate their health the same and about a fourth would rate their health better is unexpected.

Previous studies show that, for most elderly people, self-rated health remains predominantly stable for periods of from 1 to 15 years (Goldstein, Siegel, and Boyer, 1984; Lehr, 1983; Maddox and Douglass, 1973). A study of 50- to 80-year-olds noted that they believed that age-related fatigue or illness would not change their own health status (Leventhal, 1984). In fact, older adults do rate their health more positively than would be expected based on various health indicators (Ferraro, 1980; Idler, 1993). Despite poorer role function, lower energy levels, and greater fatigue, patients over age 70 do not rate their health worse than patients aged 50–70 (Mangione et al., 1993). These findings, together with those of the present study, suggest that older people view illness as an inevitable part of aging and therefore not a reason to change their health perceptions.

Even for individuals whose health perceptions became more negative after the illness, the change was minimal. The lack of association between disability levels and health perceptions at 6 weeks suggests that disability at this time may be viewed as a temporary setback rather than an actual change in health status. In fact, health perceptions after the hospitalization were more closely related to pre-
hospitalization disability and comorbid conditions than with post-hospitalization disability or illness severity. Acute illness events experienced recently may not be major determinants of health perceptions for many older persons. The personal meaning of these events may be evaluated over a relatively long period and interpreted vis-à-vis age-related expectations. Since post-illness health perceptions were more strongly related to depression and social resources than to post-illness measures of objective health status, health perceptions in the wake of a major illness may reflect individuals' psychosocial adjustment rather than the direct health impact of the event.

The improved health perceptions of some people after the illness may indicate an effect of experiencing survival. Surviving an event that is often lethal may be interpreted as a sign of vigor. Also, people may evaluate their present health in relation to their previous health; those who have experienced some degree of recovery from an illness may have a different reference point than those who have remained healthy. Perhaps some people do have 'excellent' health 6 weeks after a stroke, compared to their health immediately after the stroke. Also, for some people, hospitalization may lead to the identification and treatment of previously untreated conditions, thereby resulting in improved health over the long term. This is consistent with our finding that those whose initial health ratings were relatively poor were most likely to have improved ratings after the hospitalization.

Due to the lack of a control group, we cannot rule out the possibility that the changes in health perceptions found in some sample members may have been due to factors other than the three medical events — including, possibly, other illness events — over time. Studies specifically examining this issue could be added to ongoing longitudinal projects (Crononi et al., 1993).

In addition to revealing variability in the apparent responses of older people to an illness, our results further suggest that this variability influences recovery. Health perceptions at 6 weeks but not before the illness influenced disability at 6 months, indicating that change in self-rated health in response to the illness affects recovery. In other words, there may be a reactive component of self-rated health that influences the course of illness. These results corroborate a previous report (Wilcox, Kasl, and Berkman, 1994) that psychosocial factors during the recovery period are more important than psychosocial factors before the illness in influencing health outcomes after hospitalization. The reactive component was not apparent for everyone, however; many people did not adjust their health perceptions despite decline in their objective health status (see Table 1 for changes in disability levels). Nonetheless, enough change in health perceptions occurred to influence recovery in the sample as a whole.

The ability of self-rated health to predict subsequent disability was independent of sociodemographic characteristics, objective health status, and prior disability. Neither smoking nor a sedentary life style could account for the relationship. The results confirm the importance of physical activity for reducing post-illness disability but also show that activity does not account for the ability of health ratings to predict recovery. This study cannot rule out the possibility that depression, task support, or other factors or processes not measured may be responsible for the effects of self-rated health. Negative health perceptions may culminate in, or reflect, depression. Individuals with positive health perceptions may be more likely to obtain or report adequate support. While depression and task support eliminated the effects of self-rated health, this may have been due to sample size limitations and must be regarded as inconclusive. Idler and Kasl (1991) noted that neither depression, social support, nor other measures of social and emotional resources could account for the effects of self-rated health on mortality in the New Haven EPESE. Thus, if the effects of depression and task support found in the present study are replicated, the results would suggest that different processes influence various health outcomes such as disability and mortality (Wilcox, Kasl, and Berkman, 1994), or that different factors predict outcomes in community-based and patient samples.

A recent report (Idler and Kasl, 1995) examined the role of self-rated health in predicting change in functional ability in the total New Haven EPESE cohort of some 2,800 elderly. The primary results showed that self-ratings of health in 1982, net of baseline functional ability, health, and sociodemographic factors, were associated with change in functional ability over periods of one through six years. Individuals with poorer self-ratings were at greater risk of decline. These findings are complementary to the results presented here. The present report, however, investigates a different aspect of the dynamic interplay between self-ratings and change in disability by focusing on the acute phase of recovery following three specific health crises, by utilizing control variables reflecting the severity of the medical events, and by distinguishing between premorbid and post-event self-ratings of health.

More research is needed to identify the psychosocial processes by which health perceptions may influence recovery. Seriously ill patients may deny the impact of their illness (Levine and Zigler, 1975). Hence, elderly persons who rate their health positively despite having suffered a stroke, MI, or hip fracture may be employing denial and thus may experience less stress. However, previous analyses of this cohort found little evidence for a relationship between denial and disability outcomes. Alternatively, self-monitoring of bodily sensations may produce information that guides self-ratings and that may also lead to depression or attempts to mobilize social resources.

Limitations to the generalizability of our findings must be noted. Individuals who were hospitalized for more than one of the three medical events and those who did not survive for 6 months were excluded from the study. Very few individuals were admitted for more than one event. However, selective attrition may have reduced our ability to detect decline in health perceptions, since individuals with poorer health perceptions would have been less likely to survive. Additionally, people who were too ill or unwilling to respond to all of the post-hospitalization interview questions differed in some ways from those who fully participated. Since the health perceptions of partial participants were similar to those of full participants, it is unlikely that their inclusion in the analyses would have altered our conclusions about change in self-rated health. Nonetheless, it may have
attenuated our ability to detect a relationship between depression and disability, since partial participants were more depressed and disabled. Finally, a few individuals may have suffered a silent MI or stroke and therefore may not have been hospitalized. These rare, asymptomatic events seem unlikely to influence health perceptions.

The generalizability of study results to chronic conditions with a gradual onset is unknown. Such conditions may influence health perceptions more strongly or more consistently than in their slower course may allow elderly people more time to realistically adjust their perceptions. Nonetheless, the low correlation between premorbid health perceptions and the number of comorbid conditions suggests that chronic conditions are only a weak determinant of health perceptions. Also, it is not clear whether health perceptions would influence recovery similarly for conditions with a more insidious onset.

In conclusion, the results of this study reveal that the health perceptions of elderly survivors may decline, remain unchanged, or even improve after a serious illness. Health perceptions several weeks after an acute medical event may reflect individuals’ psychosocial functioning and, to a lesser extent, chronic conditions, rather than the health impact of the illness itself. Further model testing, ideally based on repeated measures of health perceptions, depression, social support, and other psychosocial variables, is needed to clarify the means by which health perceptions influence recovery. Health perceptions may function as a marker for a range of psychosocial processes or operate via yet unidentified mechanisms. Their effects appear to be time-dependent, with premorbid and post-illness health perceptions playing different roles in influencing the health of older people.

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