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Self-Rated Health as a Risk Factor for Prescribed Drug Use and Future Health and Social Service Use in Older People

Peter A. Bath

Sheffield Institute for Studies on Ageing, University of Sheffield, Sheffield, United Kingdom.

Background. Self-rated health is an independent predictor of mortality in older people. Recently, the need to explore other health outcomes that may be predicted by global self-ratings of health has been identified. The aim of this work was to explore the use of self-rated health as a predictor for future health and social service use and for use of prescribed medication.

Methods. 1042 community-dwelling people aged 65 and over living in Nottingham, United Kingdom, were interviewed in 1985, and survivors were reinterviewed in 1989 and 1993. Cox regression and logistic regression models were developed to see whether a self-rating of health was a predictor of 12-year mortality and of baseline, 4-year, and 8-year health and social service use and use of prescribed medication.

Results. Baseline self-rating of health was an independent risk factor for 12-year mortality, and for having seen the general practitioner, community nurse, home help support in the month before the interview, and for increased medication use. Baseline self-rating of health was also a risk factor for 4-year and 8-year use of these services and increased medication use, although it was not significant when baseline service/medication use was included in regression models.

Conclusions. Self-rating of health not only predicts mortality, but is also useful for predicting long-term service and medication use among older people who live for a number of years.

THE effectiveness of self-rated health as an independent predictor of mortality in older people has been demonstrated (1). Idler and Benyamini identified the need to study health-related outcomes other than mortality (1). Relationships among self-rated health and hospitalization (2,3), physician contacts (3), and nursing home placement (2) have previously been demonstrated. Relationships between self-rated health and current prescribed drug use are also beginning to emerge (4).

The use of global measures of self-rated health as a risk factor for contact with primary care and social care services or use of prescribed medication has not been extensively researched. General practitioner (GP) consultation rates were shown to rise as self-perception of health deteriorated in a sample of 200 patients aged 18 and over (5). Receipt of community nurse and home help services was associated with poor self-rated health in a U.K. community-based sample of people aged 75 and over (6). Community nurses in the United Kingdom are generally attached to a patient's general practice and provide nursing care for a patient in their own home. Home help services, on the other hand, provide help with domestic work. The receipt of such services may be indicative of long-term health care problems and needs in older people.

The use of self-rated health for predicting *future* health and social service contact in older people has not previously been explored, but, if effective, would be a useful means to anticipate future demands on services. Similarly, the future use of prescribed medication in relation to self-rated health has not been researched, but might also provide useful information for anticipating needs as well as giving further insights into the conceptualization of self-rated health among older people.

The aim of this work is to examine the use of global self-rating of health as a risk factor for mortality and for other health-related outcomes in a sample of community-dwelling older people in Nottingham, United Kingdom. First, self-rated health is assessed as a risk factor for mortality in this sample. Then attention is focused on self-rated health as a risk factor for recent contact with a GP, community nurse, and home help support and for current use of prescribed medication. Finally, the use of self-rated health as a risk factor for future (4- and 8-year) contact with these services and for medication use will be explored. Self-rated health remains a predictor of mortality when known risk factors, e.g., age and smoking, are included in analyses (1). Therefore, in this examination of other health-related outcomes, the effects of such factors are also considered.

Method

Samples

Data were derived from the Nottingham Longitudinal Study of Activity and Ageing (NLSAA). This is an 8-year survey of activity, health, and well-being conducted within a random sample of 1299 community-dwelling people originally aged 65 and over, of whom 1042 agreed to participate (response rate 80%). The age–sex structure of the interviewed sample was not significantly different from the original sample. The baseline survey was conducted between May and September 1985. Follow-up surveys were conducted at four yearly intervals in 1989 and 1993, with reinterview rates of 88% (n = 690) and 72% (n = 410), respectively, obtained among survivors. Information on mortality within the sample was provided by the U.K. National Health Service Central Register, where all U.K. deaths are recorded.

General physical health was assessed with a health index containing 12 items previously validated (7). The health index

scored from 0 (no health problems) to 12 (multiple health problems), covering the presence or absence of heart, stomach, eyesight, sleep, or foot problems; giddiness, headaches, urinary incontinence, arthritis and falls; long-term disabilities; and mobility status. Survey assessments were made of perceived health (How would you rate your present health?) with five response categories (poor, fair, average, good, excellent). Contacts with GPs, community nurses, and home help services in the previous month were assessed. The number of current drugs, prescribed by a doctor within the previous six months and being taken in accordance with the doctor's instructions, was also recorded. The interviewer asked to see the prescribed drugs and details of these were recorded, e.g., name and dose. Current smoking status was assessed.

Statistical Analyses

For all models, the effect of self-rated health on its own was explored in the first instance, before demographic (age and sex) and health-related (health index, smoking status, baseline service/drug use) variables were included in the models. The purpose of this was not only to provide further evidence on the effects of these variables on mortality and health-related outcomes within this sample, but also to help examine their influence on self-rated health as a risk factor for these outcomes.

Mortality.—In the 12-year period from September 1985 to January 31, 1998, the study received notification of 667 deaths (288 men and 379 women). Relationships between self-rated health and mortality were assessed in Cox proportional hazards regression models with survival time (measured in number of days from baseline assessment to death or censorship [for those people still alive] on January 31, 1998) as the dependent variable. Baseline self-rating of health was the only independent variable in model 1, and age group (<75 years; 75 years and over) and sex were added in model 2. Smoking status (smoker/nonsmoker in 1985) the 12-item health index score (1985), contact (yes/no) in the last month with GP, community nurse, and home help, and prescribed medication use (taking 0/1 prescribed drug; taking 2+ prescribed drugs) were included in model 3 as covariates. The hazard ratio (HR) was calculated for each category of variable relative to the reference category and for each increment in the health index score. A forced-entry approach to variable selection was used in all models.

General practitioner and health and personal social service use and use of prescribed medications.—Logistic regression models were used to analyze relationships between self-rated health in 1985 and levels of contact with health and personal social services and use of prescribed medication in 1985 and, among survivors, in 1989 and 1993. The dependent variables for the separate models were contact with (i) GP, (ii) community nurse, or (iii) home help in the month before interview in 1985, 1989, and 1993, and prescribed drug use at each interview wave. Contacts were assessed in relation to 1985 ratings of health. For each dependent variable, three models were used. Model 1 included only 1985 ratings of health, model 2 included age group and sex, and model 3 also included smoking status and score on the 12-item health index score as covariates. Additionally, for the 1989 and the 1993 models, baseline level of service contact/drug use was entered as a covariate. For the 1993 models, people who rated their health as poor or fair were analyzed in one category because of the relatively few people surviving in these groups. A forced-entry approach to model selection was used in all models.

SPSS (Statistical Package for the Social Sciences) version 7.5 was used for all statistical analyses (SPSS, Inc., Chicago, IL).

Results

The distributions of the respondents' self-rated health according to age and sex are shown in Table 1. Poor/fair and good/excellent categories of health rating are shown as merged, although univariate associations were calculated for separate categories. There was a significant association between self-rating of health and sex, whether the respondent had seen the GP, community nurse, and home help in the month before interview, and with prescribed medication use in 1985. There was also a significant association between self-rated health and whether the individual was still alive at the time when the second and third interview waves commenced (May 1985 and 1993).

Mortality

Survival was significantly related to self-rated health (Table 2). Twelve-year mortality was significantly increased in people who rated their health as poor and fair, relative to those people who rated their health as excellent (model 1), even when age and sex were controlled (model 2). When smoking status, health index score, prescribed medication use, and contacts with health and social care services were included (model 3), mortality was still significantly increased in people who rated their health as poor.

Health and Social Service and Prescribed Medication Use

1985.—Table 3 presents the models for service contact levels and use of prescribed medication in 1985 relative to 1985 ratings of health. In summary, having less than an excellent rating of health was strongly associated with recent contact with health and social services and with increased use of prescribed medication (model 1s), even when age and sex (model 2s) and health score and smoking (model 3s) were adjusted for. What is also evident from Table 3 is that the odds ratios for service/drug use generally increased from good to average to fair to poor ratings of health within models, although this did not constitute a dose-effect response

1989.—Table 4 presents the models for service contact levels in 1989 among people who were reinterviewed, relative to 1985 ratings of health. In summary, having less than excellent rating of health was associated with recent contact with health and social services and with increased use of prescribed medication in 1989 (model 1s), even when age and sex (model 2s) were adjusted for. However, when baseline health score, smoking, and service/drug use were included in models, self-ratings health were no longer significant (model 3s). Baseline health score and, in particular, service/drug use were associated with recent contact with health and social services and with increased use of prescribed medication in 1989.

Table 1. Univariate Associations of Self-Rated Health With Demographic and Clinical Variables (1985) and With Status in 1989 and 1993

Variable	*N* (Missing)	Self-Rating of Health, *n*		
		Poor/Fair	Average	Good/Excellent
Overall (%)	995‡	213 (21.4%)	167 (16.8%)	615 (61.8%)
Age				
<75	496	184	77	313
75+	499	107	90	302
Sex*				
Male	382	69	55	258
Female	613	144	112	357
Not seen GP in previous month†	651 (6)	107	92	452
Seen GP in previous month	338	103	75	160
Not seen district nurse in previous month†	902 (5)	173	155	574
Seen district nurse in previous month	88	38	12	38
Not seen home help in previous month†	834 (5)	146	137	451
Seen home help in previous month	156	65	30	61
Taking 0/1 prescribed medicine†	495 (18)	54	63	378
Taking 2+ prescribed medicines	482	155	104	223
Status on 30 April 1989				
Alive†	780 (0)	151	126	503
Dead	215	62	41	112
Status on 30 April 1993				
Alive†	570 (0)	93	96	381
Dead	425	120	71	234

*$p < .05$.
†$p < .001$.
‡Forty-seven participants failed to answer this question and are excluded from this table

Table 2. Twelve-Year Mortality According to Self-Rated Health in 1985

1985 Independent Variable	Category	HR (95% CI)		
		Model 1	Model 2	Model 3
Self-Rated Health	Excellent	1.00 (–,–)	1.00 (–,–)	1.00 (–,–)
	Good	1.12 (0.88,1.43)	1.17 (0.92,1.49)	1.01 (0.78,1.30)
	Average	1.17 (0.88,1.43)	1.27 (0.95,1.70)	1.01 (0.74, 1.38)
	Fair	1.39 (1.04,1.85)*	1.54 (1.15,2.05)†	1.09 (0.79,1.51)
	Poor	2.46 (1.75,3.47)§	2.56 (1.81,3.62)§	1.81 (1.23,2.68)†
Age	75+	—	2.47 (2.10,2.92)§	2.21 (1.86,2.63)§
Sex	Male	—	1.51 (1.29,1.78)§	1.61 (1.34,1.92)§
Smoker	Yes	—	—	1.22 (1.01,1.47)*
Health index score	(0–12)	—	—	0.97 (0.92,1.01)
Seen GP in previous month	Yes	—	—	1.04 (0.87,1.24)
Seen community nurse	Yes	—	—	1.50 (1.15,1.96)†
Received home help support	Yes	—	—	1.49 (1.20,1.86)‡
Taking 2+ prescribed drugs	Yes	—	—	1.65 (1.37,2.00)§

*$p \leq .05$; †$p \leq .01$; ‡$p \leq .001$; §$p \leq .0001$.

1993.—Table 5 presents the models for service contact levels in 1993 among people who survived, relative to 1985 ratings of health. Having less than excellent rating of health was associated with recent contact with health and social services and with increased use of prescribed medication in 1993 (model 1s). When age and sex were included in models, self-ratings of health were still significantly associated with contact with a GP, home help, and prescribed drug use in 1993 (model 2s). However, when baseline health score, smoking status, and service/drug use were included, self-ratings of health were no longer significant (model 3s).

Discussion

This work adds to the considerable body of evidence that self-rated health is an independent predictor of mortality among older people (1). In this sample of community-dwelling older people there was increased mortality among people with poor self-rated health after age, sex, baseline smoking, health status, use of health and social care services, and prescribed medication were controlled. Other studies described in a recent review have also demonstrated significantly increased mortality among people who rated their health as fair and good (1). Idler and Kasl, for example, showed increased mortality in

Table 3. Self-Rated Health (1985) and Health Service and Prescribed Drug Use (1985)

Dependent Variable	Health Rating	Odds Ratios (95% CI) Model 1	Model 2	Model 3
Seen GP in previous month	Excellent	1.00 (–,–)	1.00 (–,–)	1.00 (–,–)
	Good	1.65 (1.05,2.60)*	1.66(1.05,2.61)*	1.46 (0.91,2.33)
	Average	3.37 (2.03,5.60)§	3.38 (2.03,5.62)§	2.54 (1.48,4.36)‡
	Fair	3.42 (2.04,5.75)§	3.48 (2.07,5.87)§	2.52 (1.45,4.40)‡
	Poor	5.73 (3.00,10.94)§	5.73 (3.00,10.98)§	3.47 (1.72,7.02)‡
Seen community nurse in previous month	Excellent	1.00 (–,–)	1.00 (–,–)	1.00 (–,–)
	Good	ns	ns	ns
	Average	ns	ns	ns
	Fair	3.91 (1.53,9.99)†	3.67 (1.42,9.53)†	2.76 (1.00,7.66)*
	Poor	9.00 (3.35,24.21)§	8.43 (3.06,23.23)§	6.44 (2.09,19.84)‡
Received home help support in previous month	Excellent	1.00 (–,–)	1.00 (–,–)	1.00 (–,–)
	Good	2.28 (1.06,4.90)*	2.31 (1.05,5.05)*	ns
	Average	3.86 (1.71,8.70)†	3.78 (1.64,8.71)†	2.69 (1.13,6.43)*
	Fair	6.91 (3.12,15.33)§	7.86 (3.44,17.95)§	5.48 (2.30,13.10)§
	Poor	10.38 (4.31,25.01)§	11.26 (4.47,28.38)§	7.65 (2.81,20.81)§
Two or more prescribed drugs	Excellent	1.00 (–,–)	1.00 (–,–)	1.00 (–,–)
	Good	3.08 (1.96,4.85)§	3.11 (1.96,4.91)§	2.29 (1.43,3.67)‡
	Average	6.84 (4.07,11.48)§	6.61 (3.91,11.17)§	3.41 (1.96,5.93)§
	Fair	9.39 (5.46,16.14)§	9.43 (5.44,16.35)§	4.89 (2.73,8.74)§
	Poor	24.38 (10.76,55.26)§	24.67 (10.77,56.48)§	9.81 (4.09,23.57)§

*$p \leq .05$; †$p \leq .01$; ‡$p \leq .001$; §$p \leq .0001$.

Model 1s contained self-rated health only. Model 2s contained self-rated health and age and sex. Model 3s contained self-rated health, age, sex, smoking status, and health score. ns: nonsignificant.

Table 4. Self-Rated Health (1985) and Health Service and Prescribed Drug Use (1989)

1989 Dependent Variable	1985 Health Rating	Odds Ratios (95% CI) Model 1	Model 2	Model 3
Seen GP in previous month	Excellent	1.00 (–,–)	1.00 (–,–)	1.00 (–,–)
	Good	ns	ns	ns
	Average	1.78 (1.01,3.14)*	1.78 (1.01,3.14)*	ns
	Fair	ns	ns	ns
	Poor	3.45 (1.43,8.31)†	3.45 (1.43,8.32)†	ns
Seen community nurse in previous month	Excellent	1.00 (–,–)	1.00 (–,–)	1.00 (–,–)
	Good	4.14 (1.25,13.75)*	4.23 (1.27,14.09)*	ns
	Average	ns	ns	ns
	Fair	4.63 (1.25,17.13)*	4.64 (1.25,17.21)*	ns
	Poor	8.73 (1.94,39.33)†	8.86 (1.95,40.23)†	ns
Received home help support in previous month	Excellent	1.00 (–,–)	1.00 (–,–)	1.00 (–,–)
	Good	2.62 (1.26,5.47)†	2.80 (1.33,5.91)†	ns
	Average	3.26 (1.43,7.43)†	3.26 (1.41,7.55)†	ns
	Fair	4.88 (2.17,11.01)§	4.91 (2.14,11.26)‡	ns
	Poor	ns	ns	ns
Two or more prescribed drugs	Excellent	1.00 (–,–)	1.00 (–,–)	1.00 (–,–)
	Good	2.06 (1.31,2.26)	2.15 (1.35,3.42)‡	ns
	Average	3.71 (2.10,6.57)§	3.62 (2.03,6.44)§	ns
	Fair	6.44 (3.44,12.06)§	6.34 (3.36,11.99)§	ns
	Poor	48.44 (6.31,372.03)‡	50.36 (6.51,389.31)‡	ns

*$p \leq .05$; †$p \leq .01$; ‡$p \leq .001$; §$p \leq .0001$.

Model 1s contained self-rated health only. Model 2s contained self-rated health, age, and sex. Model 3s contained self-rated health, age, sex, smoking status, health score, and baseline contact with service/drug use. ns: nonsignificant.

Table 5. Self-Rated Health (1985) and Health Service and Prescribed Drug Use (1993)

1993 Dependent Variable	1985 Health Rating	Odds Ratios (95% CI) Model 1	Model 2	Model 3
Seen GP in previous month	Excellent	1.00 (–,–)	1.00 (–,–)	1.00 (–,–)
	Good	1.94 (1.07,3.52)*	1.94 (1.06,3.52)*	ns
	Average	ns	ns	ns
	Poor/fair	2.88 (1.37,6.06)†	2.93 (1.39,6.17)†	ns
Seen community nurse in previous month	Excellent	1.00 (–,–)	1.00 (–,–)	1.00 (–,–)
	Good	ns	ns	ns
	Average	ns	ns	ns
	Poor/fair	2.48 (0.99,6.19)*	ns	ns
Received home help support in previous month	Excellent	1.00 (–,–)	1.00 (–,–)	1.00 (–,–)
	Good	2.28 (1.02,5.11)*	2.41 (1.06,5.45)*	ns
	Average	3.69 (1.49,9.16)†	3.65 (1.45,9.17)†	ns
	Poor/fair	3.38 (1.33,8.57)†	3.20 (1.24,8.23)*	ns
Two or more prescribed drugs	Excellent	1.00 (–,–)	1.00 (–,–)	1.00 (–,–)
	Good	2.54 (1.45,4.45)‡	2.60 (1.48,4.57)‡	ns
	Average	3.92 (1.90,8.08)‡	3.86 (1.86,7.99)‡	ns
	Poor/fair	5.59(2.54,12.29)§	5.40 (2.44,11.93)§	ns

*$p \leq .05$; †$p \leq .01$; ‡$p \leq .001$; §$p \leq .0001$.

Model 1s contained self-rated health only. Model 2s contained self-rated health, age, and sex. Model 3s contained self-rated health, age, sex, smoking status, health score, and baseline contact with service/drug use. ns: nonsignificant.

people who rated their health as poor, fair, or good when a large number of health status variables, including self-reports of chronic conditions, functional disability, health practices, and resources, were included as covariates (8). Although the categories of self-rated health used in this sample of older people were not as sensitive at predicting mortality as those in the Idler and Kasl study (8), poor self-rated health was still an independent predictor of mortality.

The finding that self-rated health was significantly associated with recent contact with health and social care services and increased use of prescribed medication in 1985 was not surprising but is nonetheless interesting. Pope suggested that health status measured following efficacious medical care might be perceived to be good, even though a medical condition precipitated the need for medical care (9). Such postdictive measures may therefore weaken associations between perceived health and service utilization. Dening and colleagues, however, showed that the receipt of services, such as home help and community nurse visits, was associated with poor/very poor ratings of health in older people (6), similar to the findings of this study. Rosholm and Christensen (4) reported a relationship between poor self-rated health and drug use among elderly people. Recent contact with primary care health or social care services or multiple prescribed drug use among older people as measured in these studies may indicate ongoing use rather than contact within a discrete medical care episode. Although it is not possible from the cross-sectional models to determine the causal nature of the relationships, it is plausible that ongoing contact with services or multiple prescribed drug use, if indeed indicative of chronic health or disability problems, could negatively influence perceptions of health.

What is interesting about the results described here is that, although only poor rated health was an independent predictor of mortality, fair and average ratings of health were also associated with increased contact with services even when age, sex, and current health status were controlled. Additionally, people who rated their health as good were significantly more likely to be taking two or more drugs. Global ratings of health appear a more sensitive independent measure of cross-sectional health status in this study than they are for long-term mortality.

Miilunpalo and colleagues showed a linear inverse association between self-ratings of health and use of physician services (lower rating of health predicting higher number of physician contacts) in a 1-year follow-up in a sample of people aged 35–63 (10). The capacity of self-rating of health to predict increased future long-term use of health and social services and prescribed drugs among older people has not previously been demonstrated. Even though self-ratings of health were eclipsed by baseline service/drug use, when included in the models with health index scores, these findings demonstrate the potential of a single question to provide information about future needs for health and social care and medication in older people.

Baseline service/drug use was a very strong predictor of 4- and 8-year service/drug use and suggests that either continuous long-term or recurrent use was being measured among these older people. A limitation of this study is that service use was assessed by recency of contact in the period immediately before 4- and 8-year follow-up interviews, and medication use was measured at follow-up. No information was available about service contact or medication use between waves of data collection. Therefore it is not possible to differentiate between continuous and recurrent use of services or medication. It can be speculated that people who died before each interview wave may have had increased use of services and medication preceding their death, and had this information been available it could have strengthened the associations demonstrated here. A

prospective longitudinal study recording service and medication use on a more frequent basis, e.g., through monitoring health care episode data, is needed to clarify these issues.

Although baseline smoking was an independent predictor of mortality in this study, in general it did not appear to increase other negative health outcomes measured here and actually reduced the odds of multiple drug use in 1993. A possible explanation for these rather surprising findings is that older people who smoke may attribute associated health problems to their smoking behavior and consequently do not seek medical attention.

This study also demonstrates that self-rated health is a predictor of health outcomes in those older people who live for a number of years, in contrast to mortality studies, which concentrate on those people who die within a defined time period.

As well as providing information on the future health and social care needs of older people with low self-ratings of health, this work provides a useful insight into those older people who perceive their health to be excellent. People who feel their health is excellent are not only likely to live longer, but they are also more likely to remain independent of health and social care support and are less likely to require medication as they grow older. Although studies of self-rated health have tended to focus on mortality in older people, it has the potential to contribute to our understanding of people who both live longer and who age more healthily.

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Address correspondence to Dr. Peter Bath, Sheffield Institute for Studies on Ageing, University of Sheffield, Community Sciences Centre, Northern General Hospital, Sheffield S5 7AU, UK. E-mail: p.a.bath@sheffield.ac.uk

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