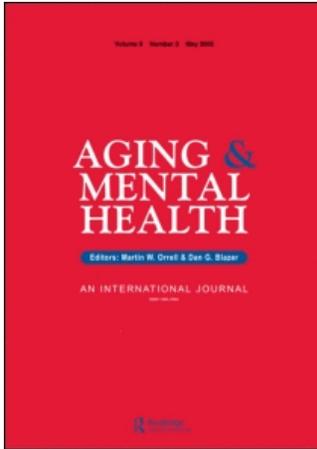


This article was downloaded by:[ABM Utvikling]
On: 20 December 2007
Access Details: [subscription number 787564627]
Publisher: Routledge
Informa Ltd Registered in England and Wales Registered Number: 1072954
Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Aging & Mental Health

Publication details, including instructions for authors and subscription information:
<http://www.informaworld.com/smpp/title~content=t713404778>

Does sense of coherence affect the relationship between self-rated health and health status in a sample of community-dwelling frail elderly people?

H. I. Saevareid^{ab}; E. Thygesen^{cd}; H. A. Nygaard^e; T. C. Lindstrom^d

^a Faculty of Health and Sport, Agder University College, Arendal

^b Section of Nursing Sciences, Department of Public Health and Primary Health Care, University of Bergen,

^c Faculty of Health and Sport, Agder University College, Kristiansand

^d Department of Psychosocial Science, Faculty of psychology, University of Bergen, Bergen, Norway

^e Section for Geriatric Medicine, Department of General Practice and Primary Health Care, University of Bergen, Bergen, and NKS Olaviken, Hospital for old age psychiatry, Erdal

Online Publication Date: 01 November 2007

To cite this Article: Saevareid, H. I., Thygesen, E., Nygaard, H. A. and Lindstrom, T. C. (2007) 'Does sense of coherence affect the relationship between self-rated health and health status in a sample of community-dwelling frail elderly people?', *Aging & Mental Health*, 11:6, 658 - 667

To link to this article: DOI: 10.1080/13607860701368513

URL: <http://dx.doi.org/10.1080/13607860701368513>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.informaworld.com/terms-and-conditions-of-access.pdf>

This article maybe used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

Does sense of coherence affect the relationship between self-rated health and health status in a sample of community-dwelling frail elderly people?

H. I. SAEVAREID^{1,5}, E. THYGESEN^{2,4}, H. A. NYGAARD³, & T. C. LINDSTROM⁴

¹*Faculty of Health and Sport, Agder University College, Arendal*, ²*Faculty of Health and Sport, Agder University College, Kristiansand*, ³*Section for Geriatric Medicine, Department of General Practice and Primary Health Care, University of Bergen, Bergen*, and *NKS Olaviken, Hospital for old age psychiatry, Erdal*, ⁴*Department of Psychosocial Science, Faculty of psychology, University of Bergen, Bergen, Norway*, and ⁵*Section of Nursing Sciences, Department of Public Health and Primary Health Care, University of Bergen*

(Received 25 July 2006; accepted 29 December 2006)

Abstract

Background: The objective of this study was to examine the association between self-rated health (SRH) and physical, functional, social and mental health measures in community dwelling elderly people needing nursing care. Of special interest was how coping resources (SOC) influenced this relationship. Self-rated health is a good predictor of future health status as measured by mortality and morbidity, decline of functional abilities, use of healthcare, and nursing home placement. The high mean age and the relatively high level of care-dependency in this sample, make this investigation important.

Methods: A hierarchical regression analysis was applied in a cross sectional sample of 242 elderly (mean age 84.6 years). **Results:** Subjective health complaints (SHC) in both sexes, and psychological distress (only in men), was associated directly with SRH. Coping resources associated with SRH directly, and indirectly through subjective perceived health (SHC and GHQ) but only in men. The influence of registered illness was mediated through the effects of subjectively perceived health in both women and men. Sex differences moderated the effects of SOC on SRH.

Conclusion: Subjectively perceived health was more important in the perception of SRH than objective health measures. Men, in contrast to women, tend to convert physical illness into emotional distress.

Introduction

A person's current health status is an important indicator of both short-term prospective health status and the need for healthcare in the more distant future (Mossey & Shapiro, 1982). Studies show that self-rated health (SRH), as measured by questions like 'How is your health now?', is a good predictor of future health status as measured by mortality and morbidity (Benyamini & Idler, 1999; Idler & Benyamini, 1997; Leventhal, Patrick-Miller, Leventhal, & Burns, 1998; Mossey & Shapiro, 1982), decline of functional abilities (Idler & Kasl, 1995; Idler, Russell, & Davis, 2000; Wilcox, Kasl, & Idler, 1996), use of healthcare (Fylkesnes, 1993; Idler & Benyamini, 1997; Menec & Chipperfield, 2001; Wolinsky, Stump, & Johnson, 1995) and nursing home placement (Weinberger et al., 1986).

Because SRH has strong predictive power, it is important to understand the concept and its components. Assessing SRH involves both the subjective assumptions and actual knowledge of one's own health status (Idler & Benyamini, 1997; Pinguart, 2001; Prager, Walter-Ginzburg, Blumstein, & Modan, 1999). A patient's health judgement seems to be based on biomedical, functional and emotional components (Kaplan & Baron-Epel, 2003; Krause & Jay, 1994; Manderbacka, 1998). This raises the question of whether coping resources also are included in the patient's assessment of self-rated health. According to Antonovsky (1987), health is affected by coping resources, defined as the 'sense of coherence' (SOC). The salutogenic approach focuses on factors that promote health, in contrast to the factors

causing disease (pathogenesis). 'Sense of coherence' reflects the extent to which a person finds life to be meaningful (motivational and emotional disposition), manageable (readiness to control and influence events) and comprehensible (cognitive disposition).

Several studies have shown associations between SOC and various health measures and outcomes (Eriksson & Lindstrom, 2005; 2006). Cross-sectional studies have indicated a link between a high level of sense of coherence and good health (Lustig, Rosenthal, Strauser, & Haynes, 2000; Nilsson, Holmgren, & Westman, 2000; Pallant & Lae, 2002; Rennemark & Hagberg, 1999; Smith & Meyers, 1997; Suominen, Blomberg, Helenius, & Koskenvuo, 1999). In longitudinal study settings, SOC has also been found to be a predictor of health outcome (Kivimaki et al., 2002; Poppius, Tenkanen, Hakama, Kalimo, & Pitkanen, 2003; Suominen, Helenius, Blomberg, Uutela, & Koskenvuo, 2001), although some studies reports no such connection (Atroshi et al., 2002; Coe & Hall, 1998; Kivimaki, Feldt, Vahtera, & Nurmi, 2000). A high SOC is associated with fewer diseases, disabilities, symptoms and health complaints and less distress (see Feldt, Leskinen, Kinnunen, & Ruoppila, 2003).

Studies investigating the associations and effects of coping resources on SRH, have found strong relations between a high level of SOC and a good perceived health, both in cross-sectional and prospective designs (Elovainio & Kivimaki, 2000; Schneider, Driesch, Kruse, Nehen, & Heuft, 2004; Schneider, Driesch, Kruse, Nehen, & Heuft, 2006; Suominen et al., 1999; 2001). Of particular interest is the four-year follow-up-study by Suominen et al. (2001), including 1976 individuals, where an initial level of strong SOC predicted good subjective state of health in both women and men.

Men and women incorporate different information when evaluating their own health (Baron-Epel & Kaplan, 2001; Benyamini, Leventhal, & Leventhal, 2000; Jylha, Guralnik, Ferrucci, Jokela, & Heikkinen, 1998) and this may have implications for using SRH as an indicator of future health. Some studies show that SRH predicts mortality better in men than in women (Benyamini & Idler, 1999; Idler & Benyamini, 1997) but these findings are not

unanimous (Jylha et al., 1998). Sex differences in the distribution of SOC have also been found, as well as sex differences in how SOC influences health. Men usually have a slightly higher SOC than women, although the differences are small (Eriksson & Lindstrom, 2005). Furthermore, some studies have reported that SOC influences health only in women (Kivimaki et al., 2000; Smith & Meyers, 1997), whereas others have shown a similar relationship only in men (Carmel, Anson, Levenson, Bonneh, & Maoz, 1991). Other studies did not reveal any gender differences (Nilsson et al., 2000; Suominen et al., 2001).

The objective of this study was to examine the association between SRH and physical, functional, social and mental health measures in community dwelling elderly people needing nursing care. Of special interest was how SOC influenced this relationship. Although the relevance of SOC on health conditions has been investigated in several studies, only a few have addressed this topic in older people. The high mean age and the relatively high level of care-dependency in this sample, makes this investigation important.

According to the literature reviewed in this paper, we anticipated SRH to be associated with both health-related variables and SOC. We hypothesised that (1) both health-related variables and SOC would influence SRH directly, expecting (2) subjective perception of health to be more pertinent than 'objective' health conditions. Furthermore we anticipated (3) that SOC associated with SRH indirectly through health-related variables (a confounding or mediating effect). Based on the recent findings on the relationship between health-related variables, SOC and SRH, special attention was paid to gender differences. We would expect (4) that women and men incorporate different aspects of health- and coping resources when judging their own health.

The hypothesised model of associations is presented in Figure 1. We considered SOC to be a stable personality trait, and therefore would act as an exogenous variable in the model. Due to the fact that the present sample consisted of patients in home nursing care, 'objective' health conditions, like registered illness and ability to perform activities of daily living, were given the same status.

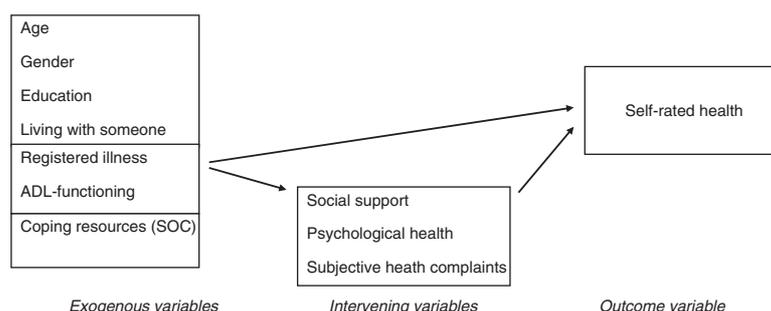


Figure 1. Hypothetical model of associations between exogenous variables (socio-demographic variables, illness conditions, and coping resources), intervening variables (subjective health related variables) and self-rating of health.

Methods

Subjects

A total of 348 individuals aged 75 years and over, living in seven different municipalities in southern Norway and receiving nursing care at home, were asked to participate. In five of the municipalities, all patients receiving home nursing care were included, while a random selection of patients was made in the remaining two municipalities. In all, 78 (22.4%) refused to participate, nine died and nine were permanently institutionalized before the interview took place. A further ten interviews were not completed because of high levels of fatigue in respondents. The final sample comprised 242 respondents, of whom 171 (70%) were women. Due to a mistake, 18 respondents did not answer one of the questions. In addition, a few other single items were missing, leaving an actual sample after listwise deletion of 215 (150 women and 65 men). The mean age for the sample was 84.6 years (range 75–98 years), with a mean age for women of 84.8 years and for men 84.2 years. Fifty-three per cent of respondents had completed elementary school or less, 36% intermediate school and 10% grammar school or higher education. One-third of the men and 22% of the women lived with a spouse or others in the household and 41% of the women and 37% of the men received nursing care once or several times per day.

Home nursing care in Norway

In Norway, any person in need of nursing care is entitled to receive home nursing care free of charge. The service is offered as day and night care and aims to help people to continue living in their own homes. Of 354,000 elderly people aged 75 years and over, 19.7% received home nursing care, whereas 10.2% were cared for in long-term care facilities (Statistics Norway, 2005).

Sampling procedures

Home nurses invited potential participants to the study. The unit-nursing officers in charge of the home nursing units were entitled to decide whether the patients fulfilled the inclusion criteria; being physically and mentally able to understand the purpose of the investigation, being able to communicate adequately with another person and express their own opinions. Each respondent received oral and written information and gave written consent before the interview. Experienced registered nurses performed a structured interview, based on a questionnaire containing 375 questions. The interviews were performed in the respondents' homes, and an interview lasted about 90 minutes.

The interview

The interview was based on scales and questions used in a previous study of home-dwelling elderly people (Gundersen & Saevareid, 1995). Questions were added after qualitative interviews with patients and healthcare professionals. The complete questionnaire was piloted on eight patients prior to the main survey sampling. Self-rated health was measured by the question 'How is your health now?' The answer categories were 1 = poor, 2 = not very good, 3 = good and 4 = very good.

Subjective health complaints. Subjective health complaints (SHC) were scored using the SHC scale (Eriksen, Ihlebaek, & Ursin, 1999), which includes 30 items that register subjective somatic and psychological complaints experienced during the past 30 days. The SHC instrument measures subjective experience, occurrence, intensity and duration of health complaints, without focusing on diagnoses (Aasland, Olf, Falkum, Schweder, & Ursin, 1997; Eriksen et al., 1999) and without reference to specific diagnostic categories. The scores range from 0 to 3 giving a total score on the measurement from 0 (excellent) to 90 (poor).

Reported illness. Reported illness was assessed using an eight-item checklist covering common physical diseases affecting older people: angina pectoris, congestive heart failure, hypertension, thyroid disease, diabetes, cancer, osteoarthritis and osteoporosis, giving a total score between zero (no disorders) and eight.

Sense of coherence. Sense of coherence was rated by the 13-item version of the SOC questionnaire (Antonovsky, 1987) and analysed according to Antonovsky's recommendations (Antonovsky, 1996). Each question was rated on a scale from 1 (lowest) to 7 (highest) level of coping resources, giving total scores ranging from 13 (poor coping) to 91 (excellent coping). Cronbach's alpha in the present study was 0.80.

Function in activities of daily living. Function in activities of daily living (ADL) was assessed by the Barthel ADL Index (Mahoney & Barthel, 1965) and scored as recommended by (Wade & Collin, 1988). The instrument includes ten basic ADL functions. The score ranges from 0 (dependent in all functions) to 20 (independent in all functions). The standardized item alpha was 0.82.

Psychological distress. Psychological distress was measured with the 12-item version of the General Health Questionnaire (GHQ) (Goldberg & Williams, 1988; Malt, Mogstad, & Refn, 1989). Each question was scored using a Likert scale of 0–3,

Table I. Descriptive statistics for dependent variables and the most relevant independent variables.

	Women (<i>n</i> = 150) Mean (SD)/%	Men (<i>n</i> = 65) Mean/%	<i>t</i> -test/Chi-square for gender differences
SRH	2.29 (0.69)	2.38 (0.82)	<i>t</i> = 0.840
Age	84.18 (4.924)	84.64 (5.156)	<i>t</i> = -0.614
Education	1.46 (0.64)	1.58 (0.66)	<i>t</i> = 1.284
Living with someone	22%	32.3%	$\chi^2 = 2.562$
SOC	69.35 (9.33)	70.86 (8.24)	<i>t</i> = 1.183
RI	1.67 (1.25)	0.95 (1.16)	<i>t</i> = -4.072*
ADL	17.71 (2.82)	18.18 (2.93)	<i>t</i> = 1.095
SHC	11.67 (8.28)	9.37 (8.45)	<i>t</i> = -1.843
GHQ	10.21 (2.96)	9.94 (2.90)	<i>t</i> = -0.634
SPS	53.39 (6.15)	51.38 (8.18)	<i>t</i> = -1.775

**p* < 0.001, analysed by listwise deletion.

Data are presented as mean (standard deviation) and percents, for women and men separately, *t*-tests and Chi-square were used to assess the differences between women and men.

Abbreviations: SRH = self-rated health; SOC = sense of coherence; RI = reported illness; ADL = activities of daily living; SHC = subjective health complaints; GHQ = general health questionnaire; SPS = social provisions scale.

giving a total range of 0–36. A low score indicates an absence of psychological distress.

Social support. Social support was assessed by the Revised Social Provisions Scale (SPS) (Cutrona, 1986; Cutrona & Russell, 1987; Cutrona, Russell, & Rose, 1986), which contains four subscales: ‘attachment’, ‘social integration’, ‘nurturance’ and ‘reassurance of worth’. Responses were recorded as: strongly agree, agree, disagree or strongly disagree. The sum of the complete 16-item version was used to assess the level of social support and ranged from 16 (low social support) to 64 (high social support). The standardized item alpha was 0.81.

Education. Education was recorded at three levels: elementary school (1), intermediate or vocational school (2) and grammar school, college or university training (3).

Household composition. Household composition was registered according to whether the patient lived with someone (1) or not (0).

Statistics

SPSS 12.1 for Windows (SPSS Inc. Chicago, IL, 1989–2002) was used for data analysis. Tests of internal consistency were performed using Cronbach’s alpha. Bivariate correlations were tested with Pearson’s correlation coefficient and all tests were two-tailed in the listwise deletion. Means were compared using the independent samples *t*-test. Chi-square test was used testing differences in nominal-level variables. Multiple linear regression models were used to test the effects of independent variables on SRH. Differences in effect sizes between men and women were tested by interaction terms, one at a time, and with main effects included in the multiple regression model (UNIANOVA in a general linear model procedure). Collinearity diagnostics

were performed according to recommendations in the SPSS linear regression model.

Because of the high number of significant interactions between sex and other predictors, we decided to analyse the data separately for men and women.

Ethical considerations

The study followed the guidelines for community medical research and was approved by the Regional Committee for Medical Research Ethics and The Norwegian Data Inspectorate.

Results

Descriptive statistics are presented in Table I. Self-rated health levels were higher in men than in women, but the difference was not significant. Women reported significantly more registered illnesses (RIs) than men. Nominal variables were tested with Chi-square tests, and no significant differences were found.

Bivariate correlations are presented in Table II. In both women and men, SRH was positively correlated with age and inversely correlated with SHC and the number of RIs. In men, high SRH was positively correlated with ADL and SOC, and inversely related to GHQ and education. In women, living alone was associated with high levels of SRH (Point biserial coefficient for the nominal variable).

Due to previously reported sex differences in the associations between SOC and SRH, we performed multiple linear regressions for the whole sample with two-way interaction terms involving sex and each of the other predictors, one term at a time. Significant interactions between sex and coping resources (SOC) ($F = 9.165$; $p = 0.003$), and sex and psychological distress ($F = 8.052$; $p = 0.005$) emerged (Figures 2 and 3). Since the influence of SOC

Table II. Matrix Correlation for SRH and the independent variables in women and men.

Women (n = 150)	Men (n = 65)									
	SRH	Age	Education	LwS	SOC	RI	ADL	SHC	GHQ	SPS
SRH		0.275*	-0.248*	0.037	0.522***	-0.356**	0.274*	-0.524***	-0.454***	0.200
Age	0.243**		-0.154	-0.080	0.275*	-0.257*	0.143	-0.283*	-0.080	-0.061
Education	-0.042	-0.140		0.036	-0.011	0.036	-0.332**	0.098	0.166	-0.051
LwS	-0.245**	-0.157	-0.105		-0.065	-0.115	0.001	0.017	0.015	0.150
SOC	0.159	0.136	0.115	-0.074		-0.168	0.132	-0.433***	-0.502***	0.461***
RI	-0.297***	-0.182*	-0.096	0.205*	-0.069		0.089	0.566***	0.221	0.049
ADL	0.146	0.113	0.107	-0.112	0.146	0.034		-0.145	-0.147	0.021
SHC	-0.401***	-0.209*	-0.114	0.185*	-0.372***	0.356***	-0.129		0.377**	-0.174
GHQ	-0.106	-0.176*	0.157	-0.088	-0.451***	0.046	-0.122	0.336***		-0.320**
SPS	0.065	0.073	-0.051	-0.026	0.207*	-0.026	0.428***	0.028	-0.023	

Pearson's correlation coefficients: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ analysed by listwise deletion. (Point biserial coefficient for the nominal variable).

Values for women are listed to the left of the diagonal, and for men to the right of the diagonal.

Abbreviations: SRH, self-rated health; LwS, living with someone; SOC, sense of coherence; RI, reported illness; ADL, activities of daily living;

SHC, subjective health complaints; GHQ, general health questionnaire; SPS, social provisions scale.

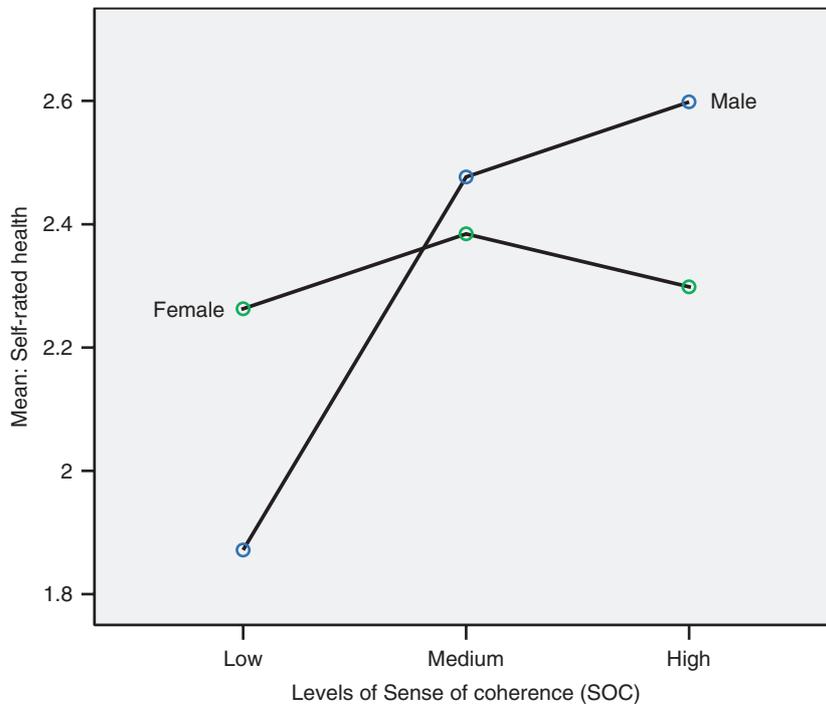


Figure 2. Self-rated health as a function of the level of sense of coherence (SOC). The data are estimated marginal means and linear trends (standardized beta) among males and females controlled linearly for age, education, living with someone, RI, ADL, SHC, GHQ and SPS.

on SRH was the focus of this investigation, and since sex differences moderated the effects of SOC on the variance of SRH in this sample, further analyses were performed for women and men separately.

In order to estimate how, and to what extent, health status and coping resources influenced SRH, we performed a hierarchical regression analysis, presented in Table III. Variables were entered block-wise, according to the hypothetical model of associations between possible exogenous and intervening variables presented in Figure 1. Since it was important to distinguish between the effects

of objective health conditions and subjectively perceived health, the exogenous block was entered stepwise, as presented in Table III, models 1–3.

Exogenous variables

Age influenced the variance of SRH in both women and men; older age groups experiencing better SRH than younger. In women, living with someone influenced the SRH negatively (Table III, model 1). All these effects, however, disappeared when subjectives perceived health related variables were later entered into the equation. (Table III, model 5)

Table III. Self-rated health: Standardized regression coefficients and adjusted R^2 , block-wise hierarchical model for women and men.

Self-rated health	r	Women ($n=150$)					r	Men ($n=65$)				
		Model 1	Model 2	Model 3	Model 4	Model 5		Model 1	Model 2	Model 3	Model 4	Model 5
		β	β	β	β	β		β	β	β	β	β
Age	0.243**	0.204*	0.147	0.133	0.108	0.109	0.243**	0.248*	0.134	0.034	0.038	0.112
Education	-0.042	-0.037	-0.077	-0.089	-0.113	-0.108	-0.248*	-0.212	-0.136	-0.170	-0.148	-0.103
LwS	-0.245**	-0.217**	-0.165*	-0.163*	-0.134	-0.135	0.037	0.065	0.014	0.043	0.064	0.034
RI	-0.297***		-0.248**	-0.245**	-0.156	-0.153	-0.356**		-0.336**	-0.278*	-0.134	-0.120
ADL	0.146		0.128	0.115	0.097	0.094	0.274*		0.240	0.180	0.137	0.155
SOC	0.159			0.105	0.033		0.522***			0.443***	0.328*	
SPS	0.065				0.006	0.013	0.200				-0.046	0.070
GHQ	-0.106				0.056	0.043	-0.454***				-0.146	-0.248*
SHC	-0.401***				-0.305**	-0.313***	-0.524***				-0.215	-0.286*
Adj R^2		0.086	0.143	0.148	0.198	0.203		0.080	0.194	0.374	0.390	0.337

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$, analysed by listwise deletion.

The model estimated the influence of various health measures on SRH, whether the effect of SOC is mediated by a set of putative intervening variables as well as the extent to which the associations between these latter variables are confounded by a common association with SOC and SRH. Abbreviations: LwS = living with someone; RI = reported illness; ADL = activities of daily living; SOC = sense of coherence; SPS = social provisions scale; GHQ = general health questionnaire; SHC = subjective health complaints.

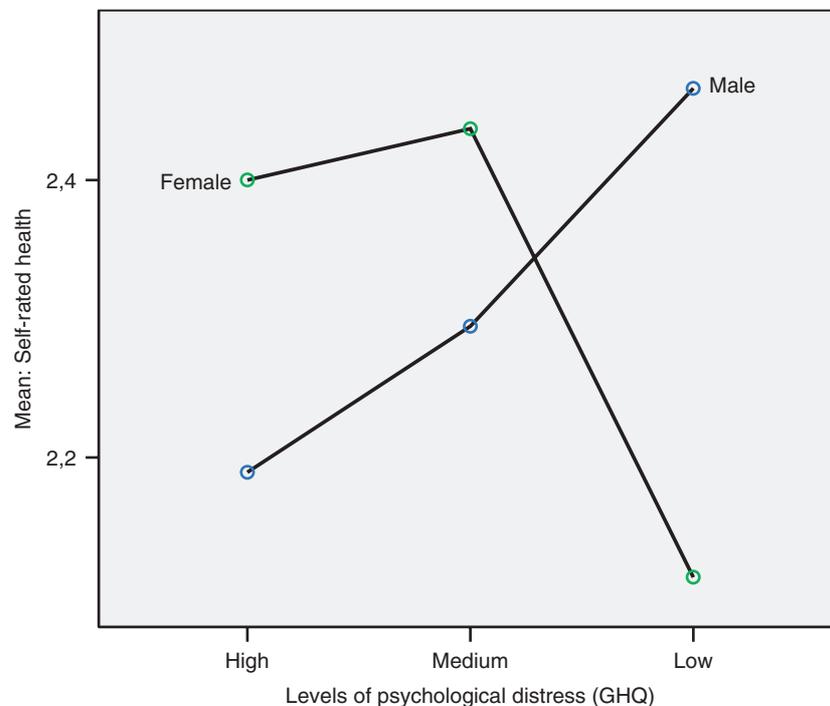


Figure 3. Self-rated health as a function of the level of psychological distress (GHQ). The data are estimated marginal means and linear trends (standardized beta) among males and females controlled linearly for age, education, living with someone, RI, ADL, SHC, GHQ and SPS.

Registered illness contributed to the variance in SRH both among women and men (Table III, models 2–3). For women this effect disappeared when SHC were entered to the equation (Figure 3, model 4). Among men, the influence of RI also disappeared in model 4 when the intervening variables were entered to the model, mainly due to the role of SHC.

Including SOC in the model did not influence the variance of SRH in women (Table III, model 3). In men, however, including SOC as the last exogenous variable almost doubled the explained variance of SRH.

Intervening variables

Subjective health complaints was the only variable significantly contributing to the variance of SRH in women, when all variables were included in the model (Table III, model 4).

In men, both GHQ and SHC influenced the variance of SRH directly, when the effect of SOC was excluded from the equation (Table III, model 5). However, when SOC was included in the model (Table III, model 4), this association was no longer significant. This indicates that the effects of the intervening variables are confounded by SOC;

of the 14.3% increased explained variance in SRH, solely by adding intervening variables to the model, (SOC not included), 12.7% is confounded with the underlying effect of SOC. Furthermore, among men, the intervening variables mediated the influence from RI, (β was reduced from -0.278^* to -0.134) (Table III, models 3–4). A partial mediation of SOC was also seen (Table III, models 3–4).

The independent variables included in the analysis explained considerably more of the variance of SRH in men (adjusted $R^2=0.390$) than in women (adjusted $R^2=0.198$).

Collinearity diagnostics showed no collinearity between any of the variables included in the models.

Discussion

The relation between various health variables and SRH was examined in a sample of elderly women and men living in their own homes and in need of home nursing care. In particular, the influence of SOC on these associations was investigated.

The analyses were performed following a theoretical model of hypothesised associations among the variables involved (Figure 1). Hierarchical regression analysis showed that subjectively perceived health, like SHC (in both sexes) and psychological distress (only in men), was associated directly with SRH. This was an expected outcome of hypothesis 1. Coping resources, however, associated with SRH only in men, which was not expected. Registered illness, measuring 'objective' health conditions, also associated with SRH, however this relation was mediated through the effects of subjectively perceived health in both women and men, supporting the expectations of subjectively perceived health being more pertinent than objective health—hypothesis 2. Coping resources influenced SRH indirectly through SHC and GHQ, but only in men. As a result, only parts of hypothesis 3 were supported. Sex differences moderated the effects of SOC on SRH, which was in accordance with hypothesis 4.

In the present study, we found no significant difference between men and women in the mean score for SRH. This finding is consistent with recent research indicating that sex differences in the level of SRH are smaller than previously assumed, primarily because previous studies did not control for differences in age, socioeconomic status and degree of disability (Arber & Cooper, 1999; Lahelma, Martikainen, Rahkonen, & Silventoinen, 1999; MacIntyre, Hunt, & Sweeting, 1996; McCullough & Laurenceau, 2004). The present sample consisted of patients receiving home nursing care with comparable levels of health status and functioning. As socioeconomic difference is small in Norway, our findings support the notion that sex differences in SRH are small.

Age, sociodemographic variables and SRH

Age was positively correlated with SRH, which is in contrast to most of the previous reported findings in old-aged samples. Age-related decline in self-rating of health most often are due to age-associated multimorbidity, increased frailty or preoccupation with body sensations (see Pinguart, 2001). On the other hand, since a positive SRH has shown to predict length of survival, the oldest of the elderly may report higher values of SRH, simply due to selective survivorship caused by their own good health (Idler, 1993). The cross-sectional design in the present investigation makes further clarification of these possible reasons impossible. However, increasing age was associated with fewer diseases, less SHC and less GHQ in both women and men (Table II). The positive association between age and SRH may therefore be due to sample-composition; the youngest of the patients in the home nursing unit were actually in more need of care than the eldest.

Correlations between living with someone and increased numbers of RIs and SHC were found in women but not in men. This was probably the reason why these women also reported a decrease in SRH (Table III, model 1–3). Particularly in old age, being a care-giving spouse, (most commonly a woman), may represent a considerable burden if the spouse has poor health and requires care and attendance (Pinguart & Sorensen, 2006) but we do not have any information in this sample that can further explain the sex differences in the association between family composition and SRH.

Health conditions and SRH

Subjective health complaints were associated with SRH in both women and men. Previous findings have demonstrated that the presence of ill health and the restrictions that this imposes on everyday life seem to be the main determinants of SRH (see Pinguart, 2001). It is interesting to note that in our study, SHC had a stronger association with SRH than either present RI or ADL. Similar findings have been demonstrated by Schneider et al. (2004) and Kivimaki et al. (2000). While our study showed that RI did influence SRH directly in both men and women, this effect was mediated through subjective health complaints (Table III, model 5). This means that SHC are more crucial for the evaluation of a person's own health than the presence of RI. Subjective health complaints are common in the general population (Eriksen & Ihlebaek, 2002) and are reported more frequently by women than by men (Ihlebaek, Eriksen, & Ursin, 2002). The present study confirms these findings. Subjective health complaints is a symptom-oriented index of health complaints, whereas SRH is a global measure. Controlling for the influence of SHC on the variance of SRH in both women and men indicated that SHC

provides information regarding which complaints influence the SRH in the elderly.

Psychological distress was associated with self-rating of health only in men. This sex difference may be explained by the fact that throughout life, men and women have different life experiences, diseases and bodily functions. Men experience more life-threatening and fatal diseases than women and the relationship between self-rated health and mortality is stronger in men than in women (Af Sillen, Nilsson, Mansson, & Nilsson, 2005; Benjamins, Hummer, Eberstein, & Nam, 2004; Vuorisalmi, Lintonen, & Jylha, 2005). Therefore, in men, physical complaints are more often perceived as threatening, leading to significant psychological distress (Beekman, Kriegsman, Deeg, & Vantilburg, 1995; Verbrugge, 1985). Women, to a greater extent than men, tend to include mild diseases and non-health-related variables, such as events that happen to significant others, when judging their SRH (Baron-Epel & Kaplan, 2001; Benyamini et al., 2000; Jylha et al., 1998; Turner & Avison, 1989). According to our study, men's SRH is more directly connected to their own health-related variables (Benyamini et al., 2000; Gonzalez, Chapman, & Leventhal, 2002).

Coping resources and SRH

In men, SOC were associated with SRH directly, but also seemed to act as an underlying factor that influences the relationship between other health measures and SRH. When SOC was introduced in model 4 (Table III), the effects of SHC and GHQ disappeared, leaving SOC as the only variable associated with SRH. The sex-difference in the association between SOC and SRH was somewhat surprising and difficult to explain. In cross-sectional designs, a strong association between SOC and SRH has been frequently reported in both women and men (Kivimaki et al., 2000; Schneider et al., 2004; 2006; Suominen et al., 2001) and in some prospective studies SOC has been found to predict health outcome only among women (Kivimaki et al., 2000). In this sample, the univariate relations between SOC and all other independent variables revealed rather equal patterns in both sexes. A difference however, emerged in the relations between SRH and SOC, and between SRH and GHQ since no relations were found in any of them in women, contrary to men. In both women and men, however, SOC and GHQ were strongly related. It thus seems that in this sample of care-dependent elderly, SOC and psychological distress are perceived rather differently in women and men and this may explain some of the sex-difference in the perception of SRH.

The study has some limitations. The refusal rate of 22% may limit the generalization of our findings but a response rate of 78% is reasonably high in this vulnerable population. Furthermore, the difference

in sample size between men and women gives higher statistical power to the analyses for women than for men. The skewed sex ratio could be a reflection of the survivor effects of the fittest men into old age rather than a real gender difference.

In conclusion, the reported findings in this study indicate that men, in contrast to women, tend to convert physical illness into emotional distress. The finding that SOC influences SRH differently in men and women may also indicate underlying sex differences in the comprehension of the SOC questionnaire and that further research is needed.

References

- Aasland, O. G., Olf, M., Falkum, E., Schweder, T., & Ursin, H. (1997). Health complaints and job stress in Norwegian physicians: The use of an overlapping questionnaire design. *Social Science & Medicine*, *45*, 1615–1629.
- Af Sillen, U., Nilsson, J. A., Mansson, N. O., & Nilsson, P. M. (2005). Self-rated health in relation to age and gender: Influence on mortality risk in the Malmo Preventive Project. *Scandinavian Journal of Public Health*, *33*, 183–189.
- Antonovsky, A. (1987). *Unraveling the mystery of health: How people manage stress and stay well*. San Francisco, CA: Jossey-Bass.
- Antonovsky, A. (1996). The salutogenic model as a theory to guide health promotion. *Health Promotion International*, *11*, 11–18.
- Arber, S., & Cooper, H. (1999). Gender differences in health in later life: The new paradox? *Social Science & Medicine*, *48*, 61–76.
- Atroshi, I., Andersson, I. H., Gummesson, C., Leden, I., Odenbring, S., & Ornstein, E. (2002). Primary care patients with musculoskeletal pain: Value of health-status and sense-of-coherence measures in predicting long-term work disability. *Scandinavian Journal of Rheumatology*, *31*, 239–244.
- Baron-Epel, O., & Kaplan, G. (2001). General subjective health status or age-related subjective health status: Does it make a difference? *Social Science & Medicine*, *53*, 1373–1381.
- Beekman, A. T. F., Kriegsman, D. M. W., Deeg, D. J. H., & Vantilburg, W. (1995). The association of physical health and depressive symptoms in the older population: Age and sex differences. *Social Psychiatry and Psychiatric Epidemiology*, *30*, 32–38.
- Benjamins, M. R., Hummer, R. A., Eberstein, I. W., & Nam, C. B. (2004). Self-reported health and adult mortality risk: An analysis of cause-specific mortality. *Social Science & Medicine*, *59*, 1297–1306.
- Benyamini, Y., & Idler, E. L. (1999). Community studies reporting association between self-rated health and mortality: Additional studies, 1995–1998. *Research on Aging*, *21*, 392–401.
- Benyamini, Y., Leventhal, E. A., & Leventhal, H. (2000). Gender differences in processing information for making self-assessments of health. *Psychosomatic Medicine*, *62*, 354–364.
- Carmel, S., Anson, O., Levenson, A., Bonneh, D. Y., & Maoz, B. (1991). Life events, sense of coherence and health: Gender differences on the Kibbutz. *Social Science & Medicine*, *32*, 1089–1096.
- Coe Rm, R. J., & Hall, M. M. (1998). Sense of coherence and survival in the chronically ill elderly. In T. E. McCubbin, A. L. Thompson, et al. (Eds.), *Stress, coping, and health in families. Sense of coherence and resiliency* (pp. 265–275). Thousand Oaks, CA: Sage.

- Cutrona, C. E. (1986). Objective determinants of perceived social support. *Journal of Personality and Social Psychology*, 50, 349–355.
- Cutrona, C. E., & Russell, D. W. (1987). The Provisions of social relationships and adaptation to stress. In W. H. Jones & D. Perlman (Eds.), *Advances in personal relationships* (Vol. 1, pp. 37–67). Greenwich, CT: JAI Press.
- Cutrona, C. E., Russell, D. W., & Rose, J. (1986). Social support and adaptation to stress by the elderly. *Psychology and Aging*, 1, 47–54.
- Elovainio, M., & Kivimaki, M. (2000). Sense of coherence and social support: Resources for subjective well-being and health of the aged in Finland. *International Journal of Social Welfare*, 9, 128–135.
- Eriksen, H. R., & Ihlebaek, C. (2002). Subjective health complaints. *Scandinavian Journal of Psychology*, 43, 101–103.
- Eriksson, M., & Lindstrom, B. (2005). Validity of Antonovsky's sense of coherence scale: A systematic review. *Journal of Epidemiology and Community Health*, 59, 460–466.
- Eriksson, M., & Lindstrom, B. (2006). Antonovsky's sense of coherence scale and the relation with health: A systematic review. *Journal of Epidemiology and Community Health*, 60, 376–381.
- Eriksen, H. R., Ihlebaek, C., & Ursin, H. (1999). A scoring system for subjective health complaints. *Scandinavian Journal of Public Health*, 27, 63–72.
- Feldt, T., Leskinen, E., Kinnunen, U., & Ruoppila, I. (2003). The stability of sense of coherence: Comparing two age groups in a 5-year follow-up study. *Personality and Individual Differences*, 35, 1151–1165.
- Fylkesnes, K. (1993). Determinants of healthcare utilization: Visits and referrals. *Scandinavian Journal of Social Medicine*, 21, 40–50.
- Goldberg, D., & Williams, P. (1988). *A user's guide to the general health questionnaire*. London: Nfer-Nelson.
- Gonzalez, J. S., Chapman, G. B., & Leventhal, H. (2002). Gender differences in the factors that affect self-assessments of health. *Journal of Applied Biobehavioral Research*, 7, 133–155.
- Gundersen, T., & Saevareid, H. I. (1995). Treatment with ace-inhibitors in older patients with chronic congestive-heart-failure. *Cardiology in the Elderly*, 3, 281–283.
- Idler, E. L. (1993). Age differences in self-assessments of health: Age-changes, cohort differences or survivorship. *Journals of Gerontology*, 48, S289–S300.
- Idler, E. L., & Benyamini, Y. (1997). Self-rated health and mortality: A review of twenty-seven community studies. *Journal of Health and Social Behavior*, 38, 21–37.
- Idler, E. L., & Kasl, S. V. (1995). Self-ratings of health: Do they also predict change in functional ability. *Journals of Gerontology Series B—Psychological Sciences and Social Sciences*, 50, S344–S353.
- Idler, E. L., Russell, L. B., & Davis, D. (2000). Survival, functional limitations and self-rated health in the NHANES I Epidemiologic Follow-up Study, 1992: First National Health and Nutrition Examination Survey. *American Journal of Epidemiology*, 152, 874–883.
- Ihlebaek, C., Eriksen, H. R., & Ursin, H. (2002). Prevalence of subjective health complaints in Norway. *Scandinavian Journal of Public Health*, 30, 20–29.
- Jylha, M., Guralnik, J. M., Ferrucci, L., Jokela, J., & Heikkinen, E. (1998). Is self-rated health comparable across cultures and genders? *Journals of Gerontology Series B—Psychological Sciences and Social Sciences*, 53, S144–S152.
- Kaplan, G., & Baron-Epel, O. (2003). What lies behind the subjective evaluation of health status? *Social Science & Medicine*, 56, 1669–1676.
- Kivimaki, M., Feldt, T., Vahtera, J., & Nurmi, J. E. (2000). Sense of coherence and health: Evidence from two cross-lagged longitudinal samples. *Social Science & Medicine*, 50, 583–597.
- Kivimaki, M., Elovainio, M., Vahtera, J., Nurmi, J. E., Feldt, T., & Keltikangas-Jarvinen, L. (2002). Sense of coherence as a mediator between hostility and health: Seven-year prospective study on female employees. *Journal of Psychosomatic Research*, 52, 239–247.
- Krause, N. M., & Jay, G. M. (1994). What do global self-rated health items measure. *Medical Care*, 32, 930–942.
- Lahelma, E., Martikainen, P., Rahkonen, O., & Silventoinen, K. (1999). Gender differences in ill health in Finland: Patterns, magnitude and change. *Social Science & Medicine*, 48, 7–19.
- Leventhal, H., Patrick-Miller, L., Leventhal, E. A., & Burns, E. A. (1998). Does stress-emotions cause illness in elderly people? In K. W. Schaie & M. P. Lawton (Eds.), *Annual review of gerontology and geriatrics: Focus on emotion and adult development* (Vol. 17, pp. 138–184). New York, NY: Springer.
- Lustig, D. C., Rosenthal, D. A., Strauser, D. R., & Haynes, K. (2000). The relationship between sense of coherence and adjustment in persons with disabilities. *Rehabilitation Counseling Bulletin*, 43, 134–141.
- Macintyre, S., Hunt, K., & Sweeting, H. (1996). Gender differences in health: Are things really as simple as they seem? *Social Science & Medicine*, 42, 617–624.
- Mahoney, F. I., & Barthel, D. W. (1965). Functional evaluation: The Barthel Index. *Maryland State Medical Journal*, 14, 61–65.
- Malt, U. F., Mogstad, T. E., & Refn, I. B. (1989). Goldberg's General Health Questionnaire. *Tidsskrift for Den Norske Laegeforening*, 109, 1391–1394.
- Manderbacka, K. (1998). Examining what self-rated health question is understood to mean by respondents. *Scandinavian Journal of Social Medicine*, 26, 145–153.
- McCullough, M. E., & Laurenceau, J. P. (2004). Gender and the natural history of self-rated health: A 59-year longitudinal study. *Health Psychology*, 23, 651–655.
- Menec, V. H., & Chipperfield, J. G. (2001). A prospective analysis of the relation between self-rated health and healthcare use among elderly Canadians. *Canadian Journal on Aging—Revue Canadienne Du Vieillessement*, 20, 293–306.
- Mossey, J. M., & Shapiro, E. (1982). Self-rated health: A predictor of mortality among the elderly. *American Journal of Public Health*, 72, 800–808.
- Nilsson, B., Holmgren, L., & Westman, G. (2000). Sense of coherence in different stages of health and disease in northern Sweden: Gender and psychosocial differences. *Scandinavian Journal of Primary Health Care*, 18, 14–20.
- Pallant, J. F., & Lae, L. (2002). Sense of coherence, well-being, coping and personality factors: Further evaluation of the sense of coherence scale. *Personality and Individual Differences*, 33, 39–48.
- Pinquart, M. (2001). Correlates of subjective health in older adults: A meta-analysis. *Psychology and Aging*, 16, 414–426.
- Pinquart, M., & Sorensen, S. (2006). Gender differences in caregiver stressors, social resources, and health: An updated meta-analysis. *Journals of Gerontology Series B—Psychological Sciences and Social Sciences*, 61, S33–S45.
- Poppius, E., Tenkanen, L., Hakama, M., Kalimo, R., & Pitkanen, T. (2003). The sense of coherence, occupation and all-cause mortality in the Helsinki Heart Study. *European Journal of Epidemiology*, 18, 389–393.
- Prager, E., Walter-Ginzburg, A., Blumstein, T., & Modan, B. (1999). Gender differences in positive and negative self-assessments of health status in a national epidemiological study of Israeli aged. *Journal of Women & Aging*, 11, 21–41.

- Rennemark, M., & Hagberg, B. (1999). What makes old people perceive symptoms of illness? The impact of psychological and social factors. *Aging & Mental Health*, 3, 79–87.
- Schneider, G., Driesch, G., Kruse, A., Nehen, H. G., & Heuft, G. (2004). What influences subjective health in the elderly? The role of objective health factors, subjective well-being and the feeling of coherence. *Psychotherapie Psychosomatik Medizinische Psychologie*, 54, 111–112.
- Schneider, G., Driesch, G., Kruse, A., Nehen, H. G., & Heuft, G. (2006). Old and ill and still feeling well? Determinants of subjective well-being in ≥ 60 year olds: The role of the sense of coherence. *American Journal of Geriatric Psychiatry*, 14, 850–859.
- Smith, T. L., & Meyers, L. S. (1997). The sense of coherence: Its relationship to personality, stress and health measures. *Journal of Social Behavior and Personality*, 12, 513–526.
- Statistics Norway (2005). Statistical Yearbook of Norway 2005. Available at: <http://www.ssb.no/aarbok/>
- Suominen, S., Blomberg, H., Helenius, H., & Koskenvuo, M. (1999). Sense of coherence and health: Does the association depend on resistance resources? A study of 3,115 adults in Finland. *Psychology & Health*, 14, 937–948.
- Suominen, S., Helenius, H., Blomberg, H., Uutela, A., & Koskenvuo, M. (2001). Sense of coherence as a predictor of subjective state of health: Results of four years of follow-up of adults. *Journal of Psychosomatic Research*, 50, 77–86.
- Turner, R. J., & Avison, W. R. (1989). Gender and depression: Assessing exposure and vulnerability to life events in a chronically strained population. *Journal of Nervous and Mental Disease*, 177, 443–455.
- Verbrugge, L. M. (1985). Gender and health: An update on hypotheses and evidence. *Journal of Health and Social Behavior*, 26, 156–182.
- Vuorisalmi, M., Lintonen, T., & Jylha, M. (2005). Global self-rated health data from a longitudinal study predicted mortality better than comparative self-rated health in old age. *Journal of Clinical Epidemiology*, 58, 680–687.
- Wade, D. T., & Collin, C. (1988). The Barthel ADL Index: A standard measure of physical disability? *International disability studies*, 10, 64–67.
- Weinberger, M., Darnell, J. C., Tierney, W. M., Martz, B. L., Hiner, S. L., Barker, J., et al. (1986). Self-rated health as a predictor of hospital admission and nursing-home placement in elderly public-housing tenants. *American Journal of Public Health*, 76, 457–459.
- Wilcox, V. L., Kasl, S. V., & Idler, E. L. (1996). Self-rated health and physical disability in elderly survivors of a major medical event. *Journals of Gerontology Series B—Psychological Sciences and Social Sciences*, 51, S96–S104.
- Wolinsky, F. D., Stump, T. E., & Johnson, R. J. (1995). Hospital utilization profiles among older adults over time: Consistency and volume among survivors and decedents. *Journals of Gerontology Series B—Psychological Sciences and Social Sciences*, 50, S88–S100.