Self-rated health. Comparisons between three different measures. Results from a population study

Ingeborg Eriksson,[a] Anna-Lena Undén[a] and Stig Elofsson[b]

Background	Self-rating of health is among the most frequently assessed health perceptions in epidemiological research. The aim of this study was to compare different measures of global self-rated health (SRH) with respect to differences in age and sex groups and relations to hypothesized determinants.
Method	Three single-question measures of SRH were included in a health questionnaire administered to 8200 randomly chosen men and women. Two SRH measures were non-comparative, one with seven (SRH-7) and one with five response options (SRH-5), while the third measure included a comparison with others of the same age (SRH-age). SRH-7 had specified response options only at the ends of the scale, while the other two measures gave specified statements for each option. Comparisons between the SRH assessments were studied with respect to response frequencies, frequency distributions, age and gender differences and differences in associations with hypothesized determinants.
Results	The differences between the SRH measures were in most cases marginal. Some diversities may, however, be worth considering: a high drop-out rate for the SRH-7 measure in the oldest age group; a trend that SRH-7 correlated most strongly with the independent variables; SRH-age showed improved health ratings with increasing age but a less skewed frequency distribution compared to the non-comparative measures.
Conclusions	The results imply that non-comparative measures are more appropriate in longitudinal studies and that measures without specified response options might be less suitable for an older study group. The overall impression is, however, that the different measures represents parallel assessments of subjective health.
Keywords	Self-rated health, single-question measures, determinants, age and gender differences
Accepted	4 October 2000

There is an increasing interest in measurements of perceived health status in clinical settings and rehabilitation programmes, as well as in health surveys. Self-rating of health is among the most frequently assessed health perceptions in epidemiological research. A large number of empirical studies have demonstrated that a person's own appraisal of her/his general health is a powerful predictor of future morbidity and mortality, even after controlling for a variety of physical, socio-demographic and psycho-social health status indices.[1–4]

Several theories have been suggested to explain these results: Self-rated health (SRH) may reflect indications of ill health that are not bio-medically detectable or that are not included in the medical examination. Another theory is that SRH merely reflects lifestyle, or psycho-social and socio-demographic conditions known to have adverse effects on health.[5] Even though many studies control for potential confounders, the information available might not be optimal. The question has also been raised as to whether personality factors such as a weak sense of mastery or fatalism influence perceptions of health.[3] Hypochondria and preoccupation with health have also been shown to be important correlates with poor SRH.[6,7]

As SRH reflects the individual's own perception, the measure could be biased according to social desirability, expectations and relative deprivation, i.e. well-known confounders in sociological and psychological measurement theory. To our knowledge no systematic studies of these potential confounders have been

---
[a] Center for Research in General Medicine, Karolinska Hospital, Stockholm, Sweden.

[b] Institute for Social Work, University of Stockholm, Sweden.

Correspondence: Ingeborg Eriksson, Center for Research in General Medicine, Borgmästarvillan, Karolinska Hospital, 171 76 Stockholm, Sweden. E-mail: ingeborg.eriksson@ks.se

made for single-question measures of SRH. The clear pattern of correlations between SRH (in different age groups, cultures and with different measurements) and morbidity/mortality indicates that these confounders, even though they cannot be neglected, do not fully explain the variation in answers. Still, there is a need to study these problems further.

Self-rated health has been measured in various ways, using single questions or scales. The wording, type of scale and the number of response options used vary. Only a few studies have discussed different ways of measuring SRH.[8]

The single questions can be classified into three main categories: non-comparative (usually measured by asking respondents whether they would rate their health as excellent, good, fair, poor or very poor), age-comparative (usually measured by asking respondents whether they would rate their health as better, the same or worse if compared to that of other people of their age) and time-comparative, where respondents are asked to rate their health compared to how it was at a given time in the past.

The overall aim of this paper is to contribute to an increased understanding of SRH by comparing three different single question assessments of global SRH used in a normal population. Two are slightly differently phrased non-comparative questions, one with seven and one with five response options, while one is an age-comparative question with five response options. The comparison includes analyses of response patterns in men and women from different age groups. Differences in associations between the SRH measures and socio-demographic, psycho-social,

physical, mental and lifestyle factors will be studied. The question addressed is whether the choice of category (age-comparative or non-comparative) and number of response options is of significance when measuring SRH.

Methods

Study group

A random sample of 8200 people over 17 years, from two healthcare regions in the Stockholm area, was drawn from the population register filed by the County Census Bureau. The participants received a postal questionnaire in Spring 1995. After two reminders, 69% of the net population (73% of the women and 65% of the men; unidentified, dead and people living abroad excluded) had answered the questionnaire. The study group thus comprised 5470 people, 46% men and 54% women. The mean age and range was 46.6 (18–93) for men and 47.3 (18–100) for women. Mean age among non-responders was somewhat lower: 40 for men and 43 for women. Information about the socioeconomic characteristics of the study group is presented in Table 1.

Measurements

A questionnaire was constructed to measure health in a wide sense and included questions about subjective health status, chronic diseases, health care visits, socio-demographic factors, lifestyle factors, psycho-social factors and quality of life.

Table 1 Socioeconomic characteristics (percentage distribution)

	Men			Women		
	18–44 years	45–64 years	>64 years	18–44 years	45–64 years	>64 years
Family conditions						
Single household	34	18	25	29	27	54
Married/cohabiting	66	82	75	71	73	46
Children in the house	52	40	12	61	34	19
Living conditions						
Student's lodgings	3	0	0	2	0	0
Rented flat	46	30	40	48	31	43
Co-operative flat	16	15	22	15	14	28
Private house	35	55	36	35	55	26
Institution	0	0	2	0	0	3
Occupation						
Full-time employed	69	73	3	46	56	1
Part-time employed	4	4	3	21	21	1
Sick leave (long time)	1	2	0	2	4	0
Unemployed	9	7	0	8	4	0
Disablement pension	1	10	2	1	11	3
Retirement pension	0	1	92	0	1	93
Student	14	1	0	15	1	0
Other	3	2	1	7	3	1
Education						
9 years compulsory school	13	33	50	14	33	64
2 years continuation	34	28	25	35	30	20
3 years continuation	31	14	9	25	9	5
University	19	21	13	20	20	7
Other	3	4	4	5	8	5

The Gothenburg Quality of Life Instrument (GQLI) was used to measure health-related symptoms and social, physical and mental wellbeing. The participants were asked to indicate whether they had experienced any of 30 symptoms during the last 3 months. The symptoms were grouped into psychological symptoms, musculoskeletal symptoms, gastrointestinal symptoms and heart-related symptoms. Another part of the GQLI assesses global social, physical and mental wellbeing, covering general health, fitness, hearing, sight, memory, appetite, general emotional state, energy, patience, self-esteem, sleeping, work, family, economy and housing, appreciation at home and outside the home. These items were rated on a seven-grade Lickert scale ranging from 'very bad' (1) to 'excellent, could not be better' (7). The GQLI has been validated by correlating physiological and biochemical variables with the included items.[9,10]

The variables from the questionnaire were grouped into: I. Socio-demographic factors, II. Lifestyle factors, III. Psycho-social factors, IV. Mental health, V. Functional health and VI. Physical health.

Socio-demographic factors

These factors include age, housing situation, family situation, education and economic situation. Ratings of satisfaction with housing conditions on a seven-grade scale were used to assess housing situation. As a measure of family situation, marital status and size of household were used. Educational level was classified into five levels, ranging from compulsory school to university. The respondents rated their satisfaction with their economic situation on a seven-grade scale.[9]

Lifestyle factors

Leisure time activities were measured with the question 'How often have you participated in these activities in the past year?' followed by a list of leisure time activities. The response alternatives 'never', 'occasionally' or 'often/regularly' were coded 0, 1, and 2, respectively, and a summed index, was calculated for social activities.[11] Physical activity during leisure time was estimated on a four-point scale where 1 indicates no activity, 2 indicates moderate activity (cycling, walking) ≥2 h a week, 3 indicates strenuous exercise (swimming, tennis, running, etc.) once or twice a week and 4 indicates strenuous exercise ≥3 times a week.[12] Smoking habits were registered as smoker or non-smoker. Measures of dietary habits included four questions about consumption of fatty food, fruits, vegetables, fibre and sweets.[13] The scores were summed up to an index ranging from 3 to 12, where a high value indicates healthy dietary habits.

Psycho-social factors

The psycho-social factors included satisfaction with home, family, work, leisure and feeling appreciated within and outside the home. These items were rated on a seven-point scale (1 = poor, 7 = excellent).[7] This group also included information on social support (emotional and instrumental)[14] and anchorage in the local residential area and at work.[15]

Mental health

As a measurement of mental health, the following items were rated on a seven-point scale: general emotional state, energy, patience, self-esteem and sleep. Functional mental health was estimated with the question, 'Do you suffer from anxiety, nervousness or depression which entails that you cannot, or must exert yourself to be able to, have contact with others?'. Psychological symptoms such as nervousness, irritation, overwork,

restlessness and gloominess in the last 3 months were summed up to the index 'State of mind'.[9]

Functional health

Health factors that affect daily living were classified as functional health. The following questions, answered by yes or no, were included: 'Do you suffer from any disease or handicap that continually, or for limited periods, makes you (or can make you) unable to lead a normal life?', 'Do you suffer from pain or other problems that you are reminded of daily?' Ratings of sight, hearing, memory, appetite and fitness on a seven-point scale were also used as measures of functional health.

Physical health

As a measurement of physical health, chronic diseases, symptoms, health care use (number of visits to the doctors in the past year) and sick leave (number of days in the past year) were used. Chronic diseases were measured with the question: 'Are you suffering from any of the following chronic diseases?' followed by: cardiovascular disease, diabetes, hypertension, musculoskeletal disorders, chronic pain and asthma. Self-reported symptoms (in the last 3 months) were grouped into: gastrointestinal problems, pain in joints and muscles and heart-related symptoms.

Self-rated health

Self-rated health was measured using the following three questions:

I. How would you rate your general health status? (Referred to subsequently as SRH-5) with reply alternatives: Very good, Quite good, Neither good nor poor, Quite poor, and Poor.

II. How do you regard your health? (Referred to subsequently as SRH-7) with reply alternatives ranging from 1 to 7, where 1 = Very poor, and 7 = Excellent, could not be better.

III. How would you assess your general health status compared to that of others of your own age? (Referred to subsequently as SRH-age) with reply alternatives: Much better, Slightly better, Neither better nor worse, Slightly worse and Much worse.

The codings for SRH-5 and SRH-age have been reversed in the analyses, a higher value is thus always equivalent to higher ratings of health.

Statistical methods

The analyses were performed separately for sex and age groups (18–44, 45–64, ≥65 years) and in some cases educational level. Comparisons between the SRH assessments were studied with respect to response frequencies, frequency distributions, age and gender differences and differences in associations with hypothesized determinants.

Differences in SRH-mean between men and women in different age groups were tested with t-test. Associations between the different SRH assessments and the variables included in the factors (socio-demographic, lifestyle, psycho-social, mental and physical) were initially analysed as product-moment correlations (Spearman's). As a second step, multiple regression analyses were used separately for the different factors with the different SRH assessments as dependent variables and the variables included in the factors as independent variables. In

this paper, the SRH assessments are compared with respect to explained variance from the independent variables in the different factors. Significant differences are indicated according to: * $P < 0.05$, ** $P < 0.01$ and *** $P < 0.001$. Occasionally, differences on the 10% level are indicated as a +.

Results

Distributions and means

The item non-response for the three measures of SRH was between 0 and 17% in the different age, education and sex groups (Table 2). Non-responses were throughout highest for SRH-7, especially in the oldest age group and above all among the older women. The group with low to medium education had, in all sex and age groups, somewhat lower response rates for SRH-7 while there were no differences with respect to educational level for the other two measures.

The frequency distributions of the three SRH measures are presented in Table 3. The distributions were essentially similar for men and women. However, the results from the age-comparative measure shows that more men than women tended to rate their health as better than that of others of the same age (44% versus 35%), whereas no gender differences appeared among those who assessed their health as worse than others (11%). The age-comparative measure was also less skewed than the other two measures: approximately 50% chose the middle alternative (neither better nor worse) when rating their health, compared to less than 20% for the non-comparative measures.

Figure 1 presents mean values for the three SRH measures by sex and age groups. For SRH-5 and SRH-7 the patterns were similar with a tendency to poorer health ratings with increasing age, whilst the age-comparative measure showed slightly improved ratings the higher the age.

Gender differences seem to appear in the same age groups irrespective of measure, mainly among the youngest where women rate their health as significantly poorer than men do. Women consistently rate their health as poorer or the same as men.

Intercorrelations

The three measures are naturally strongly correlated. For the whole group the correlations are 0.75 between SRH-7 and SRH-5, 0.57 between SRH-7 and SRH-age, and 0.62 between SRH-5 and SRH-age. Table 4 presents intercorrelations between the SRH measures for different age, education and sex groups. There were no differences between men and women or low/medium and high educational level, but a tendency to weaker associations between measures in the 18–44 age group. The correlations were consistently strongest between the two non-comparative measures (SRH-7 and SRH-5), no matter whether the whole group or the different sex, education and age groups were compared.

Associations with determinants

Table 5 presents associations between the different SRH assessments and the hypothesized determinants. The focus here is to compare the different measures with respect to associative patterns. Significance levels are excluded from the Table as the correlation coefficients, with a few exceptions, are significant at the 0.1% level. Correlations of >0.06, >0.08 and >0.10 are in this size of material significant on the 5, 1 and 0.1 percentage level, respectively.

Table 2 Item non-response (%) for the self-rated health measures (SRH) by sex, age and education

	Men			**Women**		
	18–44 years (n = 1116)	45–64 years (n = 959)	>64 years (n = 409)	18–44 years (n = 1315)	45–64 years (n = 1000)	>64 years (n = 556)
Low/medium education[a]						
SRH-7	3.2	4.8	8.3	3.0	4.7	17.5
SRH-5	1.0	3.0	1.7	1.6	1.0	4.5
SRH-age	1.4	2.8	3.5	1.6	1.8	3.6
High education[b]						
SRH-7	3.0	2.5	6.0	2.3	2.5	10.7
SRH-5	1.9	0.9	1.2	1.2	1.1	3.6
SRH-age	1.5	1.2	0.0	1.3	1.4	5.4

[a] Compulsory school (9 years) and/or up to 2 years continuation.

[b] >2 years continuation.

Table 3 Frequency distributions (%) of three measurements of self-rated health (SRH) by sex

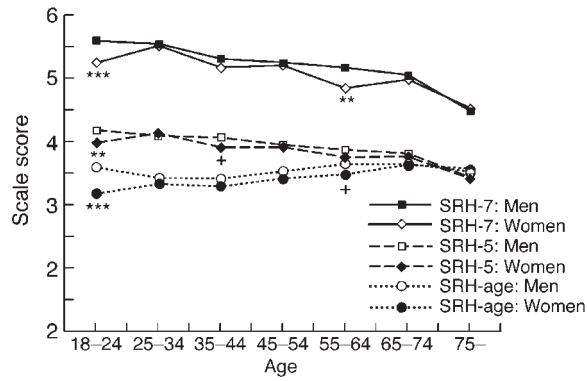| **SRH-7**				**SRH-5**				**SRH-age**			
		Men	Women			Men	Women			Men	Women
Excellent	7	20	18	Very good		26	24	Very good		23	21
	6	30	30								
	5	24	22	Fair		52	51	Slightly better		21	14
	4	14	16	Neither good nor poor		16	16	Neither better nor worse		45	53
	3	7	8	Rather poor		5	8	Slightly worse		9	9
	2	3	4								
Very bad	1	2	2	Very poor		1	1	Much worse		2	3

Figure 1 Means for three measurements of self-rated health (SRH) by sex and age group

The overall impression from the correlation analyses in Table 5 is that associations with determinants were predominantly strongest for the SRH-7 measure and weakest for SRH-age. Differences between SRH-7 and SRH-5 were in most cases negligible.

The correlations between the SRH measures and socio-demographic factors are fairly weak, especially for the 'objective measures' of age, marital status and education, while self-assessed housing and economic situation show higher correlations. The weak correlation, especially for men, between SRH-age and age implies that the instruction works, i.e. people do seem to consider their age when they assess their health in relation to others. SRH-7 were correlated more strongly with socio-demographic variables compared with the other SRH measures.

There are no evident differences between the SRH measures when comparing correlations with lifestyle factors. The different indicators for lifestyle were, apart from physical activity in leisure time, relatively weakly associated with SRH.

Within the group psycho-social factors, systematic differences between the SRH measures appeared for the more strongly correlated variables (satisfaction with home/family, work and leisure and appreciation within and outside home), where SRH-7 shows the strongest correlations and SRH-age the weakest. No such obvious differences occurred for the variables with weaker correlations (support and anchorage in living area/work/school).

The variables measuring mental health and functional health were generally strongly correlated with SRH; the trend with the strongest correlation for SRH-7 and weakest for SRH-age is obvious in this factor. The variables 'state of mind' for women and 'satisfaction with fitness' for men diverge from the trend, the SRH assessments being fairly equally correlated with these variables.

Associations between the different physical health assessments and SRH shows that most physical health conditions were strongly correlated with SRH. This is evident for the variables describing symptoms, while chronic conditions like asthma, diabetes and high blood pressure seem to have a lower impact on subjective general health ratings. Apart from sick leave, asthma and gastrointestinal problems, the SRH-7 measure showed the strongest correlations and SRH-age the weakest.

Regression analyses were performed for the variable groups separately with the different SRH measures as dependent variables. The relation between determinants and the different SRH assessments was studied with respect to explained variance. The results (Table 6) confirm the findings from the correlation analyses: the factors included explain the largest proportion of variance for the SRH-7 measure, somewhat less for SRH-5 and least for SRH-age. One exception is Lifestyle where the variables included explain the largest proportion of variance for SRH-5 which is also in concordance with the results from the correlation analyses. These patterns were valid for both men and women. No obvious interactions between gender and the SRH measures appeared: for all three measures, Psycho-social factors and Mental health explained equal proportions of variance for men and women, Physical health explained a larger proportion of variance for women, while Lifestyle and Socio-demographic factors explained a larger proportion for men.

Table 4 Correlation between self-rated health measures (SRH) by sex, age and education

	SRH-5			SRH-age		
	18–44 years (n = 2431)	45–64 years (n = 1959)	>64 years (n = 965)	18–44 years (n = 2431)	45–64 years (n = 1959)	>64 years (n = 965)
Low/medium education[a]						
SRH-7						
Men	0.69	0.76	0.75	0.53	0.67	0.60
Women	0.72	0.75	0.78	0.52	0.62	0.68
SRH-5						
Men				0.61	0.69	0.64
Women				0.56	0.65	0.67
High education[b]						
SRH-7						
Men	0.70	0.73	0.75	0.49	0.56	0.68
Women	0.72	0.78	0.78	0.52	0.60	0.78
SRH-5						
Men				0.55	0.65	0.64
Women				0.55	0.66	0.74

[a] Compulsory school (9 years) and/or up to 2 years continuation.

[b] >2 years continuation.

Table 5 Correlations between hypothesized determinants and the different self-rated health (SRH) measures by sex

	Men			Women		
	SRH-7 (n = 2360)	SRH-5 (n = 2426)	SRH-age (n = 2422)	SRH-7 (n = 2691)	SRH-5 (n = 2807)	SRH-age (n = 2799)
I Socio-demographic factors						
Age	0.17	0.20	−0.05	0.16	0.18	−0.12
Marital status	0.04	0.05	0.01	0.14	0.12	0.02
Education	0.12	0.19	0.09	0.08	0.11	0.03
Satisfaction with housing situation	0.26	0.19	0.18	0.22	0.17	0.18
Satisfaction with economic situation	0.27	0.22	0.20	0.27	0.22	0.23
II Lifestyle factors						
Physical activity in leisure time	0.27	0.32	0.28	0.21	0.24	0.17
Social activities	0.19	0.24	0.15	0.22	0.24	0.11
Dietary habits	0.11	0.12	0.19	0.05	0.08	0.11
Smoking	0.12	0.14	0.12	0.04	0.06	0.07
III Psycho-social factors						
Satisfaction with home/family	0.31	0.25	0.18	0.34	0.27	0.18
Satisfaction with work	0.37	0.31	0.21	0.39	0.35	0.29
Satisfaction with leisure	0.40	0.32	0.27	0.45	0.37	0.31
Appreciation within and outside the home	0.40	0.35	0.27	0.38	0.34	0.25
Instrumental support	0.15	0.18	0.07	0.17	0.17	0.07
Emotional support	0.15	0.19	0.11	0.20	0.19	0.08
Anchorage in living area	0.14	0.12	0.15	0.14	0.12	0.13
Anchorage at work/school	0.23	0.23	0.17	0.24	0.23	0.16
IV Mental health						
Satisfaction with general emotional state	0.49	0.44	0.34	0.49	0.42	0.33
Satisfaction with energy	0.56	0.54	0.44	0.55	0.50	0.43
Satisfaction with level of patience	0.34	0.30	0.24	0.37	0.30	0.30
Satisfaction with self-esteem	0.37	0.33	0.27	0.37	0.33	0.31
Satisfaction with sleep	0.40	0.34	0.25	0.45	0.43	0.29
Functional mental health	0.27	0.26	0.19	0.28	0.26	0.18
State of mind	0.35	0.32	0.29	0.33	0.33	0.32
V Functional health						
Disease/handicap	0.36	0.35	0.31	0.39	0.34	0.30
Pain on a daily basis	0.42	0.39	0.32	0.45	0.41	0.29
Other diseases	0.24	0.23	0.17	0.27	0.24	0.20
Satisfaction with hearing and sight	0.28	0.26	0.11	0.30	0.28	0.11
Satisfaction with memory	0.38	0.34	0.22	0.35	0.30	0.20
Satisfaction with fitness	0.50	0.52	0.49	0.53	0.48	0.43
Satisfaction with appetite	0.43	0.40	0.28	0.44	0.40	0.25
VI Physical health						
Doctors visits last year	0.39	0.35	0.23	0.43	0.41	0.30
Sick leave (no. of days last year)	0.30	0.27	0.28	0.29	0.29	0.33
Asthma	0.10	0.09	0.11	0.11	0.09	0.09
Cardiovascular disease	0.22	0.23	0.14	0.22	0.23	0.13
Diabetes	0.15	0.14	0.09	0.12	0.13	0.07
High blood pressure	0.18	0.18	0.11	0.14	0.15	0.02
Diseases in joints/muscles	0.36	0.34	0.23	0.39	0.35	0.25
Chronic pain	0.33	0.31	0.26	0.41	0.40	0.30
Gastrointestinal problems	0.27	0.25	0.24	0.26	0.25	0.26
Pain in joints and muscles	0.44	0.43	0.32	0.45	0.44	0.32
Heart symptoms	0.37	0.36	0.30	0.36	0.37	0.25

Table 6 Explained variance (%) for the self-rated health (SRH) measures by sex

	SRH-7		SRH-5		SRH-age	
	Men	Women	Men	Women	Men	Women
Socio-demographic factors	19.4	15.4	16.9	11.6	5.7	6.4
Lifestyle	11.7	9.6	17.5	11.1	11.8	5.1
Psycho-social factors	26.6	27.3	19.5	19.5	11.0	13.8
Mental health	37.3	37.7	33.3	31.7	22.0	21.3
Functional health	41.4	46.1	39.6	36.4	31.3	24.6
Physical health	35.8	38.9	31.8	36.8	22.8	26.6

Discussion

The predictive power of subjective global health assessments has been shown in a number of studies. Accordingly, different measures of global SRH are frequently used as central concepts in prospective studies with morbidity and mortality as outcome variables.[16] It is thus important to study similarities and diversities between different SRH measures and whether they measure the same thing: can the variation in SRH assessments be explained by the same factors for three different measures with similar aims but different wordings and response options? To our knowledge, no studies comparing different measures of global SRH have been published this far.

This study compares three different single question assessments of global SRH regarding response frequencies, frequency distributions for different age and sex groups and associations with related factors. Two SRH measures were non-comparative, one with seven (SRH-7) and one with five response options (SRH-5), while the third question asked the respondents to compare their health with others of the same age (SRH-age). The seven-graded measure had specified response options only at the ends of the scale, while the other two measures gave specified statements for each option.

The overall impression is that the three different SRH measurements represent parallel assessments of subjective health. This finding was expected, as more than 30 studies, in spite of differences in design, study group, follow-up period, control for confounders and SRH measurements, have demonstrated similar relations between SRH and mortality.[8] There are, however, some differences worth considering when choosing measurements for subjective health assessments.

The most striking observation concerning response frequencies was the high item non-response in the oldest age group to the SRH-7 measure, especially among women with low to medium education. This suggests that questions with non-specified response options might be less suitable for an older population. Item non-response was otherwise generally low.

All three measures gave skewed frequency distributions with high proportions of respondents rating their health as better than the middle alternative. However, the age-comparative measure was less skewed: approximately 50% when rating their health chose the middle alternative (neither better nor worse than others of the same age), compared to between 12% and 17% for the non-comparative measures. The skewness decreased with age for all measures, which seems reasonable as health problems usually increase with age. In the over 65 age group all three measures were similarly skewed. These

observations might be of importance depending on the purpose of the study. The age-comparative measure may be recommended if the sample size is small and the aim is to compare groups with poor, medium and good SRH.

The fact that throughout women rated their health as slightly poorer than men did and significantly poorer in the youngest age group is hardly surprising. A number of studies have shown that women, especially younger women, experience their health as poorer than men do.[17,18] There were, however, no differences between the SRH measures with respect to gender. When comparing mean ratings in different age groups, significant differences appeared in the same age groups irrespective of measure.

The associated variables included, summarized to six factors (Socio-demographic, Lifestyle, Psycho-social, Mental health, Functional health and Physical health), were nearly throughout strongly correlated with the SRH assessments. The overall trend was that SRH-7 correlated most strongly with the independent variables, while SRH-age showed the weakest correlations. SRH-5 resembled SRH-7 but SRH-7 correlated generally more strongly with the associated variables. This may be due to the fact that the SRH-7, as well as a number of the independent variables, was included in the GQLI which might have influenced the respondents to make their assessments in the same direction. Another explanation could be that the more differentiated scale entails a more precise health-measure.

Even though the correlations were at slightly different levels for the SRH measures, there were no differences in the patterns of associations with the independent variables. The conclusion from the analyses of associations with related factors is that the three SRH measures are equally applicable, but that the higher sensitivity of SRH-7 suggests that this measure is preferable if the study group is small.

An age comparison showed an upward trend for the age-comparative measure while the non-comparative measures showed the more expected pattern of deteriorated ratings with increasing age. This observation was more evident among men. People thus tend to overestimate their health in relation to others (or underestimate the health of others) with increasing age. The main idea behind the age-comparative measure is to achieve an age-adjustment without having to adjust for age in the analysis. The results, however, imply an 'over-adjustment' for age as the SRH-age score tends to increase with age. This may contribute to explaining the relatively weak correlation between SRH-age and the associated variables. Age-comparative measures may thus be less suitable in longitudinal studies with the aim of studying changes in SRH with increasing age.

The SRH-age measurement naturally had a weak correlation with age. The non-comparative questions did, however, also show surprisingly weak correlations with age. It appears as if subjective health is to a certain degree assessed according to what could be expected considering the circumstances.

Analyses of the associations between the different SRH measures and the hypothesized determinants were also performed with control for age. The results gave nearly identical results to the analyses without age-control. No systematic variation between the measurements appeared. These findings imply that all three SRH measures, irrespective of instruction, include age-adjustments to some extent.

The fairly weak correlations between the SRH assessments and chronic diseases such as asthma and diabetes supports the

assumption that health is assessed according to what could be expected. The observation that SRH was highly associated with physical symptoms rather than manifest diseases may also be due to the fact that a detected and medically well-treated disease can be symptom-free and thus not affect the respondent's general sense of wellbeing.

In summary, the results demonstrate that the studied SRH measures represent parallel assessments of subjective health. However, an important issue is of course whether the SRH measures differ in ability to predict morbidity and mortality. Taking previous research in the area into account, it is most likely that with a sufficient follow-up period, all three measures will prove to be predictive. Within the next few years, follow-up studies will be performed to analyse differences in predictive powers for the three measures. Analyses will also be made in order to study if there are other, maybe more important, predictors of morbidity and mortality among the hypothesized determinants.

Acknowledgement

KEY MESSAGES

As self-ratings of health is among the most frequently used health measure in epidemiological research it is of vital importance to study if different measures are equally applicable. This study compares three different single questions measuring self-rated health. The results imply that non-comparative measures are more appropriate in longitudinal studies and that measures without specified response options might be less suitable for an older study group. The overall impression is, however, that the different measures represent parallel assessments of subjective health.

References

[1] Kaplan GA, Camacho T. Perceived health and mortality: a nine-year follow-up of the human population laboratory cohort. *Am J Epidemiol* 1983;**117:**292–304.

[2] Idler EL, Angel RJ. Self-rated health and mortality in the NHANES-I epidemiologic follow-up study. *Am J Public Health* 1990;**80:** 446–52.

[3] Appels A, Bosma H, Grabauskas V, Gostautas A, Sturmans F. Self-rated health and mortality in a Lithunian and a Dutch population. *Soc Sci Med* 1996;**28:**681–90.

[4] Mossey JM, Shapiro E. Self-rated health: a predictor of mortality among the elderly. *Am J Public Health* 1982;**72:**800–08.

[5] Idler EL, Kasl S. Health perceptions and survival: do global evaluations of health status really predict mortality? *J Gerontol* 1991;**46:**55–65.

[6] Barsky AJ, Cleary PD, Klerman GL. Determinants of perceived health status of medical outpatients. *Soc Sci Med* 1992;**42:**141–45.

[7] Fylkesnes K, Førde OH. Determinants and dimensions involved in self-evaluation of health. *Soc Sci Med* 1992;**35:**271–79.

[8] Bjorner JB, Søndergaard Kristensen T, Orth-Gomér K, Tibblin G, Sullivan M, Westerholm P. *Self-Rated Health: A Useful Concept in Research, Prevention and Clinical Medicine*. Stockholm: The Swedish Council for Planning and Coordination of Research, 1996. Report No.: 96:9.

[9] Tibblin G, Tibblin B, Peciva S, Kullman S, Svärdsudd K. The Goteborg quality of life instrument—an assessment of well-being and symptoms among men born in 1913 and 1923. Methods and validity. *Scand J Prim Health Care* 1990;**1(Suppl.):**33–38.

[10] Tibblin G, Svärdsudd K, Welin L, Erikson H, Larsson B. Quality of life as an outcome variable and a risk factor for total mortality and cardiovascular disease: a study of men born in 1913. *J Hypertens* 1993; **11(Suppl.4):**581–86.

[11] Welin L, Larsson B, Svärdsudd K, Tibblin B, Tibblin G. Social network and activities in relation to mortality from cardiovascular diseases, cancer and other causes: a 12 year follow-up of the study of men born in 1913 and 1923. *J Epidemiol Community Health* 1992;**46:**127–32.

[12] Grimby G, Wilhelmsen L, Björnstorp P, Saltin B, Tibblin G. Habitual physical activity. Aerobic power and blood lipids. In: Pernow B, Saltin B (eds). *Muscle Metabolism During Exercise*. New York: Plenum Press, 1971.

[13] Folkhälsorapport för Uppsala län. *Uppsala: Centrum för Folkhälsoforskning*, Uppsala Universitet, 1993.

[14] Undén A-L, Orth-Gomér K. Development of a social support instrument for use in population surveys. *Soc Sci Med* 1989;**29:**1387–92.

[15] Östergren P-O. *Psychosocial Resources and Health. With Special Reference to Social Network, Social Support and Cardiovascular Disease.* (Academic thesis.) Malmö: Lund University, 1991.

[16] Idler E. Self-assessed health and mortality: a review of studies. *Int Rev Health Psychol* 1992;**1:**33–54.

[17] Gijsbers van Wijk C, van Vliet K, Kolk A, Everaerd W. Symptom sensitivity and sex differences in physical morbidity: a review of health surveys in the United States and The Netherlands. *Women Health* 1991;**17:**91–124.

[18] Power C, Matthews S, Manor O. Inequalities in self rated health in the 1958 birth cohort: lifetime social circumstances or social mobility? *BMJ* 1996;**313:**449–53.