

Self-rated health during adolescence: stability and predictors of change (Young-HUNT study, Norway)

Hans-Johan Breidablik¹, Eivind Meland², Stian Lydersen³

Background: Self-rated health (SRH) is an important single-item variable used in many health surveys. It is a predictor for later mortality, morbidity and health service attendance. Therefore, it is important to study how SRH is influenced during adolescence. The present study examined the stability of SRH over a 4-year period in adolescence, and the factors predicting change in it.

Methods: Analyses were based on 4-year longitudinal data from the Young-HUNT studies in Norway among adolescents aged 13–19 years. A total of 2800 students (81%) participated in the follow-up study, and 2399 of these were eligible for data analysis. Cross-tables for SRH at the start of the study (between 1995 and 1997) and 4 years later were used to estimate the stability over the period. Proportional odds logistic regression analyses of SRH during 2000–01 were carried out, controlling for initial SRH, independent variables at the start of the study and changes in the same independent variables over 4 years as covariates.

Results: In 59% of the respondents, SRH remained unchanged through the 4-year observation period during adolescence. Fewer than 4% changed their ratings of SRH by two steps or more on a four-level scale. The self-assessed general well-being, health behaviour variables, being disabled in any way, and body dissatisfaction at the start of the study and the change of these predictors influenced SRH significantly during the 4-year observation. Being diagnosed with a medical condition, or specific mental or somatic health symptoms was of less importance for later SRH. Adolescents with more health service contacts at the start of the study, or who increase their attendance rate during the 4 years, report deterioration of SRH.

Conclusion: SRH is a relatively stable construct during adolescence, and deteriorates consistently with a lack of general well-being, disability, healthcare attendance and health-compromising behaviour.

Keywords: adolescence, self-rated health, stability, Young-HUNT.

Introduction

Over the last few decades, we have observed an increase in health service attendance due to subjective health problems without any objectively verifiable disease.¹ Examples include unspecific somatisation conditions with pain, musculoskeletal complaints and vitality disorders.² Among persons receiving disability pension in western Norway, only half of the reduction in functioning could be explained by medical diagnoses or symptoms. These persons often showed markedly reduced self-evaluated physical and mental health. Rehabilitation efforts should therefore place strong emphasis on patients' perceptions of their own health.³ Other researchers have described an increasing mismatch between the adaptation required in modern society and people's resources for coping with what is expected of them—a situation that the healthcare and social security systems in their present form cannot properly come to grips with.⁴ Exploring this biopsychosocial landscape is therefore a challenging and important task.

In assessing an individual's overall perception of their own health status, one of the most commonly used single items is to ask about their self-rated health (SRH). In prospective studies in adult populations, this single measure has shown predictive power for later morbidity, mortality, the use of health services, and disability pensioning.^{5–7} In a review of 46 studies, adults reporting poor SRH showed increased mortality in 40 of the studies despite the inclusion of numerous specific health status indicators and other relevant covariates known to predict mortality.⁸ Studies have also demonstrated good test–retest reliability of SRH.⁹ and it has even been claimed that an individual's health status cannot be fully assessed without inclusion of SRH.⁷ Qualitative studies have shown that not all respondents use the same frame of reference in rating their subjective health. This frame of reference may also vary with age.¹⁰

Because of its important consequences in adult life, investigating the assessment of subjective health in early life may be of particular interest. Previous studies suggest that health is conceptualized during childhood and adolescence,^{11,12} and that adolescents define health in a broad and global way. Many of the most prevalent diseases of our time can probably be viewed as end points of long-term processes that started during childhood or adolescence.¹³ In spite of this, only a limited number of studies have examined the stability and predictors of SRH in adolescence.¹⁴

Young people typically have low rates of serious physical morbidity. However, during early adolescence SRH deteriorates, especially among girls, and a large number of adolescents report subjective health complaints and health concerns.¹⁵ Variations in demographics, structural environment,

1 Department of Research and Development, District General Hospital of Førde, Førde, Norway.

2 Department of Public Health and Primary Health Care, Section for General Practice, University of Bergen, Bergen, Norway.

3 Unit for Applied Clinical Research, Department of Cancer Research and Molecular Medicine, The Norwegian University for Science and Technology, Trondheim, Norway.

Correspondence: Hans-Johan Breidablik, Department of Research and Development, District General Hospital of Førde, Førde, Norway.
tel: +47 90182853, fax: +47 57839015,
e-mail: hans.johan.breidablik@helse-forde.no

physical health, social factors, health behaviour and psychological health status have all been found to predict SRH among adolescents.^{16,17} In an earlier cross-sectional study among adolescents, the authors found that SRH was associated with a broad spectrum of medical, psychological, social and lifestyle factors for both genders, where both the positive and negative ends of the SRH scale were affected in a similar but inverse manner.¹⁸ Studies of adults also seem to suggest that SRH forms a continuum from poor through average to good health, dependent on common risk and protective factors like physical activity and normal body mass index (BMI).⁵ A Finnish study underscores the need to enhance adolescent positive attitudes toward life and school, self-perception and coping with negative emotions.¹⁹

The adolescent period is characterized by its rapid changes in the individual, both physical and psychological, together with increasing demands from and influence of peers, school and wider society, including the mass media (i.e. 'horizontal' influence). It is also a period of increasing independence from parents and family (i.e. 'vertical' influence). How SRH is constructed and influenced during adolescent transitions seems therefore an important research question.

We discern two theoretical views of self-rated general health status: in the first, SRH is regarded as based on feedback about one's present state of wellness or illness (i.e. a more spontaneous assessment); in the second it is regarded as an individual's prior beliefs of being a healthy or unhealthy person (i.e. a more stable self-concept of health). Longitudinal studies among adults²⁰ and adolescents¹⁴ have concluded that SRH is best understood as an enduring self-concept. If SRH is found to be established mainly before adolescence, public health actions aimed at children and families will be important. The number of studies in this field is, however, limited.²¹ We have not found any longitudinal studies over a longer time span in adolescence. Given this background, the objectives of the present study were first to examine the stability of SRH over a 4-year period during adolescence; and second to identify factors influencing perceptions of SRH during this period.

Material and methods

Study populations

The county of Nord-Trøndelag in central Norway has approximately 127 000 inhabitants. In 1995–97 [time 1 (T1)], all inhabitants aged 13 years and older were invited to join a large population study, the Nord-Trøndelag Health Study (HUNT). Students at junior high and high school, aged 13–19 years, were invited to participate in the adolescent part of the study, Young-HUNT I. A total of 9131 students agreed to participate, which was 90% of the adolescent population of the region. In 2000–01 [time 2 (T2)], students in the last 2 years of high school, including the youngest students from Young-HUNT I, were invited to participate in a follow-up study, Young-HUNT II. A total of 2800 students (81%) participated. In all, 2399 students who responded on both occasions were eligible for data analyses.

Methods

Students completed a self-administered questionnaire during one school lesson in an exam setting. The questionnaire included questions on somatic and mental health, lifestyle, quality of life, use of medication and health services, reading and writing difficulties and pubertal status.

This study was based on students' self-reported data. Table 1 shows the list of questions used as predictor variables in our analyses. Some of these are single items, but most of

the independent variables were composite scores constructed from a set of questions. Subjective health complaints, used in Young-Hunt, is an eight-question scale on common psychosomatic symptoms. Psychological (mental) health, a measure of anxiety and depression, is based on a short version of SCL-25.²² Four questions on self-esteem are based on Rosenberg's scale.²³ General well-being is a five-item quality of life scale validated in earlier HUNT studies.²⁴ For subjective health complaints and psychometric scales, Cronbach's alphas at T2 are given in table 1, showing acceptable internal consistencies. All answers were recoded to yield the same direction (increasing values for increasing problems) in the composite scores. In this context, frequency of 'health service attendance', and 'trying to lose weight' were given positive scores.

The result variable in this study was based on the question: 'How is your overall health at the moment?' The question had four answer categories: 'Very good', 'Good', 'Not very good' and 'Poor'. Table 2 shows the respondents and answer percentages in 95/97 (T1) and 4 years later (T2). As the category 'Poor' constituted only 11 (0.5%) of the answers at T1 and 16 (0.7%) at T2, we combined these with the category 'Not very good' in subsequent analyses.

The independent variables were chosen to cover five main areas: (i) structural variables (gender and age group); (ii) medical variables, comprising subjective symptoms, established medical diagnosis, disability and health service attendance; (iii) psychological measures, comprising mental health, self-esteem, general well-being and body concern; (iv) relationship to school and family divorce, constituting the social variables; and (v) health-compromising habits (tobacco and alcohol consumption) and sports/exercise, comprising the lifestyle measures.

Ethics

All participants gave their written consent to participate in the study. For students under 16, parents also gave their written consent. The study was approved by the Regional Medicine Ethical Committee and the Norwegian Data Inspectorate.

Statistics

Each subscale was based on one to eight items, as seen in table 1. Each of these items had answer scores from 1 (best) to k (worst). The number of alternative answers, k , for each item varied from 2 to 8. The item score was rescaled as $(\text{score} - 1) / (k - 1)$, giving a rescaled score from 0 to 1. An average of these for the subscale was computed if at most one item on the subscale was missing, giving a subscale score in the range 0–1. Finally, each subscale score was normalized by dividing by its standard deviation.

The OR in proportional odds logistic regression has the same interpretation as would have the OR in standard (binary) logistic regression, if a cut off were made between any two categories of the dependent variable. Covariates were SRH at T1 and one other variable at a time. In addition, a full multivariate analysis was performed with SRH at T1 and all the other variables as covariates simultaneously.

Interactions were investigated using Bonferroni correction and found to be non-significant. Two-sided P -values < 0.05 were considered significant. Results are reported as OR for the effect on reduced SRH, Wald P -values, and 95% CIs for OR.

Results

A total of 11% of respondents at T1 reported their SRH as 'poor or not very good', increasing to 13% at T2. Sixty-one percent of participants reported their subjective health as

Table 1 Variables used in the analyses, including response options, mean values/SEM values and Cronbach's alphas for composite scores at T1 (Young-HUNT I) and T2 (Young-HUNT II)

Variables	Response options	Valid responses (T1 and T2)	Cronbach's alpha (T2)	Mean/SEM (T1)	Mean/SEM (T2)
Structural					
Gender	2	2399			
Age (years)		2399		14.44/0.01	18.37/0.02
Self-rated health	4	2348			
Somatic health complaints		2267	0.82	1.43/0.02	1.57/0.02
(Have you had any of these ailments in the past 12 months?):					
Headache (without known medical cause)	4				
Neck or shoulder pain	4				
Joint or muscle pain	4				
Stomach pain (without known medical cause)	4				
Nausea	4				
Constipation	4				
Diarrhoea, upset stomach	4				
Palpitations	4				
Established medical diagnosis		2337		4.67/0.02	4.62/0.02
Have you ever had asthma?	2				
Has a doctor diagnosed you with epilepsy, diabetes or migraine?	2				
Have you had an illness that has lasted longer than 3 months?	2				
Disability (Are you disabled in any of these ways?)		2035		0.25/0.02	0.34/0.02
Restricted due to physical disease	4				
Restricted due to mental illness	4				
Health service attendance		2199		1.41/0.02	1.56/0.02
In the past 12 months have you visited a general practitioner?	2				
In the past 12 months have you been seen by a hospital doctor?	2				
Have you ever been admitted to hospital?	3				
How many times have you attended the school health centre in the past 12 months?	3				
How many times have you been absent from school due to illness in the past 12 months?	3				
Mental health problems (in the last 14 days)		2340	0.88	0.84/0.02	1.22/0.03
I am constantly afraid and anxious	4				
I feel tense or uneasy	4				
I feel hopelessness when I think about the future	4				
I feel dejected or sad	4				
I worry too much about different things	4				
Self-esteem		2305	0.83	1.85/0.02	2.74/0.01
I have a positive attitude toward myself	4				
I feel rather useless at times	4				
I feel that I don't have much to be proud of	4				
I feel that I'm a valuable person, at least equal to other people	4				
General well-being		2345	0.86	1.71/0.02	2.02/0.02
When you think about how things are going for you in general, are you basically satisfied or dissatisfied?	7				
In general, do you feel strong and good humoured or tired and worn out?	7				
Are you generally happy or sad?	7				
In the past month, have you been bothered by nervousness (irritability, uneasiness, tenseness or restlessness)?	4				
Do you sometimes feel lonely?	5				
Body concern		2307		0.53/0.02	0.73/0.02
Are you trying to lose weight?	3				
Relationship to school		2290	0.77	2.49/0.02	2.84/0.02
I have difficulties concentrating in class	4				
I look forward to school	4				
I understand what is being taught	4				
I'm satisfied with my test results	4				
Family split-up	3	2270		1.34/0.02	1.42/0.02
Health-compromising habits		2359		0.51/0.02	1.92/0.03
Do you smoke?	5				
How much beer, wine or liquor do you consume on average during 2 weeks?	4				
Sports and exercise		2345		1.24/0.02	1.51/0.02
Outside school, how many hours a week do you play sport, or exercise to the point where you breathe heavily and/or sweat?	6				
Are you actively involved in sports?	3				

Table 2 Cross-table for SRH at the start of the study (T1) and 4 years later (T2)

SRH		Young-HUNT 2 (T2)				
		Very good	Good	Not very good	Poor	Total
Young- HUNT 1 (T1)	Very good	369 (15.7)	373 (15.9)	48 (2.0)	4 (0.2)	794 (33.8)
	Good	252 (10.7)	949 (40.4)	162 (6.9)	8 (0.3)	1371 (58.4)
	Not very good	14 (0.6)	98 (4.2)	58 (2.5)	2 (0.1)	172 (7.3)
	Poor	3 (0.1)	3 (0.1)	3 (0.1)	2 (0.1)	11 (0.5)
	Total	638 (27.2)	1423 (60.6)	271 (11.5)	16 (0.7)	2348 (100)

Number of respondents (percent of total)

Table 3 Changes in SRH over a 4-year period (from T1 to T2) in adolescence, by gender and age group

Group	Change in SRH over 4 years, <i>N</i> (%)					Total
	-2	-1	0	+1	+2	
Total	60 (2.6)	537 (22.9)	1378 (58.7)	353 (15.0)	20 (0.9)	2348 (100)
Boys	32 (2.9)	241 (22.1)	626 (57.4)	177 (16.2)	15 (1.4)	1091 (100)
Girls	28 (2.2)	296 (23.5)	752 (59.8)	176 (14.0)	5 (0.4)	1257 (100)
12-14 years	45 (2.6)	412 (24.1)	988 (57.9)	249 (14.6)	13 (0.8)	1707 (100)
15-17 years	15 (2.3)	125 (19.5)	390 (60.8)	104 (16.2)	7 (1.1)	641 (100)

Mean change estimate, 95% CI, student's *t*-test *P*-value

All: -0.11, (-0.14 to -0.08), *P*<0.001

Boys/girls: 0.04, (-0.02 to 0.10), *P*=0.15

Age 12-14/15-17: -0.08 (-0.14 to -0.01), *P*=0.02

'good', with the percentages nearly identical at T1 and T2. At T1, 34% rated their health as 'very good', with a reduction to 27% at T2.

The distribution of corresponding categories of SRH at T1 and T2 are shown in table 2. In addition, girls reported lower SRH than boys, and this was most pronounced for 'very good health' with a difference between the genders of 11% at T1 and 15% at T2. In the multivariate analyses, gender was no longer significantly associated with change in SRH, indicating that gender differences were mediated by other variables.

Table 3 illustrates the change in SRH over the 4-year period. Almost three out of five adolescents (59%) gave an identical rating of own health 4 years later. Among the remainder, a majority had a change of only one step on the scale. Less than 4% changed their ratings of SRH by two steps or more. The majority of the 'changers' reported deterioration of SRH. The difference between the youngest age group (12-14 years) and the older group (15-17 years) was not significant in the regression analyses (table 4).

Analyses using proportional odds logistic regression analysis with covariates at T1, and the change in these covariates during the period, are reported in table 4. In the simple models we entered one covariate at a time (status at T1, or change from T1 to T2), adjusting only for SRH at T1. We can see from the table that all independent covariates at T1, with the exception of age and health service attendance, are significant contributors to change in SRH during the 4-year time span. Also the change of all predictor variables during the period are significant contributors, except for body concern.

From these unadjusted analyses we can see that the development of SRH over the 4 years is impacted strongly by change in general well-being (OR 1.60), while having an established prior medical diagnosis is only marginally significant, and a change over the period is not significantly associated with SRH change. The stability of SRH during the observation period is reflected by the high OR (3.3) of SRH at T1 as a predictor of SRH at T2.

In the multivariate model with all independent covariates included in the analyses, SRH at T1 is still the strongest

predictor of SRH 4 years later. General well-being at T1 and change of this measure during the time period impact change of SRH strongly (OR 1.70 and 1.80).

Both status at T1 and change during the period for somatic health complaints, disability, health service attendance, health-compromising habits, and level of sports and exercise are significant contributors to change in SRH over 4 years. Paradoxically, health service attendance is associated with deterioration of SRH. For school relationship problems only a change during the period is significantly associated with change in SRH. Established medical diagnosis at T1, and receiving a medical diagnosis during the period, are notably non-significant contributors to SRH development over time.

For mental health problems we notice a change in direction of effect from the unadjusted to the multivariate analyses. In the former, both status at T1, and change in mental health problems during the period impact later SRH. In the multivariate analysis, mental health problems and lack of general well-being seem to influence SRH in opposite directions. These measures were, however, strongly associated. When entering only one of these measures at a time in two separate analyses, the impacts were in the same direction. We therefore suspect that multi-collinearity causes a statistical artefact in the multivariate analyses.

We also performed linear regression analyses with all four categories of answers for SRH at T1 and T2 (not shown). We found similar results to our proportional odds logistic regression analyses. The explained variance was 32%.

Discussion

Although adolescence is a time of great changes in a young person's life, our study shows that SRH is on the whole a stable construct through the 4-year observation. Only a small percentage of the respondents report a major change in their rating of subjective health. Girls report subjective health deterioration more often than boys, but interestingly this difference between the genders, as with age group differences, become insignificant in the multivariate models. In addition,

Table 4 Proportional odds logistic regression analysis of the relationship between SRH at T2 and the independent variables and SRH at T1 (4 years earlier) and change in the independent variables over 4 years

Variables	Covariates in analysis: SRH T1 + actual covariate				Multivariate: all covariates and change from T1 to T2 in these covariates			
	OR	P-value	95% CI for OR		OR	P-value	95% CI for OR	
Status at T1 for covariates								
Low self-rated health	3.34	<0.001	2.89	3.87	1.99	<0.001	1.63	2.43
Female gender	1.68	<0.001	1.42	1.99	1.04	0.782	0.81	1.32
Family divorce	1.57	<0.001	1.28	1.92	1.17	0.236	0.90	1.51
Age group (15–17 years)	0.84	0.064	0.70	1.01	0.84	0.153	0.65	1.07
Somatic health complaints	1.32	<0.001	1.21	1.44	1.18	0.029	1.02	1.37
Established medical diagnosis	0.91	0.024	0.84	0.99	0.91	0.129	0.81	1.03
Disability	1.17	<0.001	1.08	1.28	1.33	<0.001	1.15	1.54
Health service attendance	1.07	0.114	0.98	1.17	1.24	0.002	1.08	1.42
Mental health problems	1.22	<0.001	1.12	1.33	0.74	0.001	0.62	0.89
Low self-esteem	1.35	<0.001	1.23	1.47	1.09	0.453	0.86	1.39
Lack of general well-being	1.37	<0.001	1.25	1.50	1.70	<0.001	1.39	2.06
Body concern	1.38	<0.001	1.26	1.50	1.28	<0.001	1.13	1.46
School relationship problems	1.24	<0.001	1.14	1.36	1.12	0.132	0.97	1.30
Health-compromising habits	1.21	<0.001	1.12	1.32	1.35	<0.001	1.19	1.52
Lack of sports and exercise	1.57	<0.001	1.43	1.72	1.64	<0.001	1.45	1.86
Change from T1 to T2 for covariates under								
Somatic health complaints	1.40	<0.001	1.29	1.51	1.23	0.001	1.09	1.40
Established medical diagnosis	1.06	0.090	0.99	1.14	0.98	0.620	0.88	1.08
Disability	1.22	<0.001	1.14	1.30	1.27	<0.001	1.14	1.42
Health service attendance	1.28	<0.001	1.18	1.38	1.27	<0.001	1.13	1.44
Mental health problems	1.37	<0.001	1.28	1.47	0.90	0.127	0.79	1.03
Low self-esteem	0.78	<0.001	0.72	0.83	1.01	0.881	0.84	1.23
Lack of general well-being	1.60	<0.001	1.48	1.73	1.80	<0.001	1.55	2.09
Body concern	1.05	0.218	0.97	1.12	1.08	0.131	0.98	1.20
School relationship problems	1.23	<0.001	1.13	1.32	1.16	0.017	1.03	1.31
Health-compromising habits	1.27	<0.001	1.20	1.35	1.24	<0.001	1.14	1.36
Lack of sports and exercise	1.36	<0.001	1.19	1.56	1.48	<0.001	1.24	1.76

our study shows that the ratings of general well-being and change of this parameter are especially important. Disability, healthcare attendance and health-compromising lifestyle are the other factors that most consistently predict deterioration of SRH.

Different questionnaires have used scales with from three to five steps of SRH. Our study is based on a four-step scale, but with very few respondents in the last step. Obviously, the number of steps on a categorical scale will influence the stability. Our results are, however, comparable with a Canadian longitudinal study over one year using a five-step scale.¹⁴ Also, the variables reflecting physical and psychological health contributed to a change in SRH in a similar manner to the present study.¹⁴ Further, a study of adults found unchanged SRH in nearly half of the respondents over a 2-year period. In a broad model including health symptoms, social support, lifestyle factors and BMI, the initial status of SRH was the most important determinant of later SRH, quite similar to our study.²⁰

The Young-HUNT survey is part of a larger longitudinal epidemiological study of the population in a district representative of the Norwegian population. In the present study we used data from a 4-year observation. The associations between the status of predictor variables at the beginning of the period and the change in the corresponding variables during the period are therefore interesting findings in exploring the origin and shaping of SRH in today's adolescent population.

As SRH seems to be shaped by a broad spectrum of predictor variables, the multivariate analyses comprise many variables with an inherit risk for artefacts due to multi-collinearity. Mental health problems and lack of general well-being correlated strongly (coefficient 0.7), while other measures were correlated by a coefficient of maximum 0.4 at T1.

In SRH research on adult populations, socioeconomic status is important. Our study lacked information about family income and education level of parents. We have, however,

initiated a new study evaluating parental factors and influence on the SRH of adolescents. The result of the present study may be interpreted as an indication that SRH is shaped mainly during childhood, where parental influence is stronger than later in life. The correlation between adolescents' SRH and their parents' ratings of own SRH would also be an interesting subject for our coming study.

The results of the present study confirm those of our former cross-sectional study.¹⁸ This allows us to draw more firm conclusions of causality. However, except for a few variables, the ORs were generally low, and even after controlling for confounding effects residual confounding may still be present. The influence of variables of change from T1 to T2 may be causal for SRH change during the 4-year observation, but causation may certainly also be bidirectional.

Taking these objections into account, we maintain that the strengths of the present study are its long-term evaluation of SRH stability, and the comprehensive evaluation of a broad spectrum of factors suspected to influence SRH. The study was also accomplished in the general adolescent population with a rather high response rate.

Interestingly, Chipperfield²⁵ found a link between over-estimation of own health compared to objective health status, and later survival among seniors. A form of positive distortion of reality may seem important. Other investigators use the expressions health pessimism/optimism for similar phenomena,^{26,27} and conclude that the research suggests that psychological beliefs such as meaning, control and optimism act as resources. Such resources may not only preserve mental health in the context of traumatic or life-threatening events, but may also be protective of physical health.^{28,29}

An interesting finding in our study is the inverse relationship between health service attendance and the resulting SRH at the end of the study period. Adolescents with more frequent health service contacts thus seem to end up with a worse impression of their own health. A possible explanation could

be that the healthcare system generally focuses on and reinforces the adolescents' impressions of health problems, thus contributing to steering them into a 'sick role' rather than focusing on a more positive and salutogenetic health perspective.³⁰ Although we have controlled for various factors, this causation is probably bidirectional: deteriorating SRH also leads to increased healthcare utilization. Healthcare providers should, however, focus more on moving people in the direction of positive SRH, and thereby contribute to a virtuous circle with absolute health benefits as a goal.

Public health promotion activities aimed at children and adolescents should therefore be advocated, focusing more on the positive aspects of life and health.

The results of the present study indicate that self-ratings of health during adolescence are less influenced by bodily and environmental feedback than by the individual's prior beliefs about him/herself as a healthy or unhealthy person. These findings should support the theory that SRH is a broad construct related to the self-concept of health, rather than reflecting a restricted medical health status in the adolescent population. The study also informs health-promoting activity by identifying causal factors that improve or aggravate SRH.

To conclude, we maintain that SRH is a relatively stable construct during adolescence, and that it deteriorates consistently with a lack of general well-being, disability, healthcare attendance and health-compromising lifestyle factors.

Acknowledgements

HUNT-Norway contributed the data material for this study. The authors would especially like to thank Turid Lingaas Holmen at HUNT for her participation and help in the study.

Key points

- Self rated health is an important construct predicting disability, morbidity and mortality also in younger populations. Factors influencing SRH in adolescence have not been examined in long-term follow up studies before.
- SRH is a relatively stable construct also during longer periods of adolescence, and deteriorates consistently with a lack of general well-being, disability, healthcare attendance and health-compromising lifestyle factors.
- This supports the theory that SRH is a broad construct related to the self-concept of health, rather than reflecting the actual medical health status.

References

- Holtedahl R. [The somatisation patient in modern society]. *Tidsskr Nor Lægeforen* 2002;122:1130–2.
- Holtedahl R. [Health conditions of patients applying for disability pension due to musculoskeletal complaints]. *Tidsskr Nor Lægeforen* 2006;126:2654–7.
- Øverland S, Glozier N, Maeland JG, et al. Employment status and perceived health in the Hordaland health study. *BMC Public Health* 2006;29:219.
- Tveråmo A, Dalgard OS, Claussen B. [Increasing psychological stress among young adults in Norway, 1990–2000]. *Tidsskr Nor Lægeforen* 2003;123:2011–15.
- Manderbacka K, Lahelma F, Martikainen P. Examining the continuity of self-rated health. *Int J Epidemiol*. 1998;27:208–13.
- Fylkesnes K, Førde OH. The Tromsø study predictors of self-evaluated health – has society adopted the expanded health concept? *Soc Sci Med* 1991;32:141–6.
- Idler EL, Benyamini Y. Self-assessed health and mortality: a review of twenty-seven community studies. *J Health Soc Behav* 1997;38:21–37.
- Idler EL, Benyamini Y. Community studies reporting association between self-rated health and mortality: additional studies, 1995 to 1998. *Res Aging Health* 1999;21:392–401.
- Lundberg O, Manderbacka K. Assessing reliability of a measure of self-rated health. *Scand J Soc Med* 1996;24:218–24.
- Krause NM, Jay GM. What do global self-rated health items measure? *Med Care* 1994;32:930–40.
- Wade TJ, Vingils E. The development of self-rated health during adolescence: an exploration of inter- and intra-cohort effects. *Can J Public Health* 1999;90:90–4.
- Mechanic D. Adolescent competence, psychological well-being, and self-assessed physical health. *J Health Soc Behav* 1987;28:364–74.
- Eder A. Risk factor loneliness. On the interrelations between social integration, happiness and health in 11-, 13- and 15-year schoolchildren in 9 European countries. *Health Promotion Int* 1990;5:19–32.
- Boardman JD. Self-rated health among U.S. adolescents. *J Adolesc Health* 2006;38:401–8.
- Haugland S, Wold B, Stevenson J, et al. Subjective health complaints in adolescence. A cross-national comparison of prevalence and dimensionality. *Eur J Publ Health* 2001;11:4–10.
- Normandeau S, Kalnins I, Jutras S, Hanigan D. A description of 5- to 12-year old children's conception of health within the context of their daily life. *Psychol Health* 1988;5:883–96.
- Natapoff JN. Children's views of health: a developmental study. *Am J Publ Health* 1978;68:995–1000.
- Breidablik HJ, Meland E, Lydersen S. Self-rated health in adolescence: A multifactorial composite. *Scand J Public Health* 2008;36:12–20.
- Rask K, Åstedt-Kurki P, Takka MT, Laippala P. Relationship among adolescent subjective well-being, health behavior, and school satisfaction. *J Sch Health* 2002;72:243–9.
- Bailis DS, Segall A, Chipperfield JG. Two views of self-rated health status. *Soc Science & Medicine* 2003;56:203–17.
- Sieving RE, Bearinger LH, Ireland M. Development of adolescent self-report measures from the national longitudinal study of adolescent health. *J Adolesc Health* 2001;28:73–81.
- Tambs K, Moum T. How well can a few questionnaire items indicate anxiety and depression? *Acta Psych Scand* 1993;87:364–7.
- Rosenberg M. *Society and adolescent self-image*. Princeton, NJ: Princeton University Press, 1965.
- Moum T, Naess S, Sørensen T, et al. Hypertension labelling, life events, and psychological well-being. *Psychological Med* 1990;20:635–46.
- Chipperfield JG. Incongruence between health perceptions and health problems. *J Aging Health* 1993;5:475–96.
- van Doorn C. A qualitative approach to studying health optimism, realism, and pessimism. *Res Aging* 1999;21:440–57.
- Peterson C. The future of optimism. *Am Psychol* 2000;55:44–55.
- Taylor SE, Kemeny ME, Reed GM, et al. Psychological resources, positive illusions, and health. *Am Psychol* 2000;55:99–109.
- Shilling C. Culture, the "sick role" and the consumption of health. *Br J Sociol* 2002;53:621–38.
- Malterud K, Hollnagel H. Positive self-assessed general health in patients with medical problems. A qualitative study from general practice. *Scand J Prim Health Care* 2004;22:11–15.

Received 4 July 2008, accepted 10 October 2008