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Aging and changes in health

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Objectives The study explored changes in the health of aging workers from 1981 to 1992.

Methods Municipal workers [age 55 to 69 (mean 61.6) years in 1992] who filled out questionnaires in both 1981 and 1992 (N = 4534) were studied. The changes in disease prevalence and perceived health were tested with Pearson's chi-square independence test. Improvement and decline in perceived health were analyzed by logistic regression models.

Results In 1992, significantly more diseases were reported than in 1981: the musculoskeletal disease rate rose from 38% in 1981 to 53% in 1992 for the women and from 35% to 49% for the men and the cardiovascular disease rate rose from 15% in 1981 to 28% in 1992 for the women and from 19% to 37% for the men. The age differences diminished during the follow-up. Self-assessed health improved in all the age groups among both those still working in 1992 and those retired. The association between illnesses and perceived health changed during the follow-up, 11% of those with no diseases experiencing their health as good in 1981 and over 40% in 1992. The most important factors explaining the improvement appeared to be a low number of physical illnesses and the absence of cardiovascular and musculoskeletal disease. Nonphysical work, frequent physical exercise, and satisfaction with life situation were also significant contributors to good perceived health.

Conclusions The improvement in perceived health during the follow-up may mean that older people have lower criteria for good perceived health than younger people do. The associations between self-assessed health and the presence of disease need further study.

Key terms age-related changes, disease, elderly, life-style, perceived health, retirement, work.

The concept of health can be defined and analyzed from different angles, namely, the biomedical, the subjective (psychological), and the sociological (relativistic). The medical concept defines disease and illness as deviations from norms, as measured by certain health indicators. These indicators include chemical or physical measures (eg, serum cholesterol, blood pressure), psychological test results, or symptoms reported by the person in question. The person can be considered healthy if no deviation from the defined reference values can be detected. The subjective dimension is defined as the perception of illness by the person in question, that is, a person's own assessment of his or her health, psychosocial conditions, and symptoms (1, 2).

From the sociological point of view, health and disease are dependent on social surroundings. The concept of illness relates to disturbances and functional limitations caused in the relationship between a person and social environment by a medically defined disease (1, 3).

There have been attempts to combine these views into a "united health" concept. Health is not merely the absence of disease, it is a dynamic and harmonious balance between a person's psychophysical surroundings, the natural environment, and the social network. Disease and illness are characterized by disturbances in these relations (3, 4).

The medical, psychological, and sociological concepts of health referred to earlier have also been used in several empirical studies (2, 5, 6). Depending on the research interest, the main topics have included, for example, symptoms and signs (2, 6), diseases (2, 5, 6), experienced health (2, 6, 7), and functional capacity (2, 5, 7, 8).

In the studies on health, self-perceived health has often been the main focus of interest (6, 7, 9, 10). However, in these studies the interpretative role of the person has to be borne in mind (11). Perceived health includes all sensations, experiences, observations, and insights associated with subjective health. Perceived

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health is recognized by a general self-assessment of health, the experienced symptoms, and functional capacity (2, 12).

The dimensions of health usually have the same direction. People with a biological disease generally consider themselves to be more ill and rate their functional capacity lower. The connection between aging and self-assessed health does not necessarily show a linear relationship, however (12).

Age and health

Aging is associated with an almost linear increase in disease. The prevalence of chronic diseases increases until the age of 64 years, after which the rate of increase slows (13). After retirement the diseases causing handicaps can remain at the same level for 10—15 years (14). The self-perceived health of aging people has been reported to be worse than that of younger groups; 40% of men and 43% of women aged 30—44 years considered their health to be good, whereas only 10% of 55- to 64-year-olds did the same (13). In most of the recent studies in Finland, about 20% of the people over 50 years of age assessed their health as poor. Among younger adults this proportion was about 5%. In the age group of 15—24 years, excellent perceived health was reported by about one-third (men 32%, women 24%), whereas in the age group of 55—64 years only a small proportion (men 6%, women 3%) assessed their health as excellent (6).

Interestingly, persons over 70 years of age perceive their health to be even better. According to Heikkinen and his co-workers (8, 14), aging is associated with more diseases, but also with personal adjustment to many symptoms. Similar results (2) suggest that the relationship between the presence of diseases and perceived health changes during aging. In middle age, perceived health parallels the presence of disease, whereas among younger and older people this relationship is distorted. This view is also typical of older persons, who assess their health more positively than younger people (2).

Women usually feel healthier than men, and the same is true for well-educated persons (10, 15). Those working in jobs with no or low demands for professional skill usually report their health as poor (10).

In a study (7) in Tampere, Finland, the prevalence of diseases and symptoms was higher and the functional capacity worse among 80- to 89-year-old subjects than among those 60—69 years of age. However, the very oldest persons perceived their health to be better than younger people did. It would seem that, within the concept of perceived health, there is more room for diseases and symptoms and even for poorer functional capacity among the oldest age groups of subjects.

In our cohort of aging municipal workers we have previously studied health in relation to the presence of disease and perceived health (16). In this report we concentrated on changes in perceived health, and we focused on the following questions: (i) how did the perceived health and reported prevalence of diseases change between 1981 and 1992, (ii) what differences were there in the perception of health between employed and retired persons, (iii) what were the associations between aging, prevalence of disease and perceived health, and (iv) what factors in 1981 predicted the perceived health in 1992?

Subjects and methods

This study was comprised of the municipal workers who returned their questionnaire in both 1981 and 1992 (N = 4534) (17). Fifty-nine percent were women. Twenty percent of the subjects were still in the same job as in 1981. Therefore we had the opportunity to compare changes in health between those continuing in their previous work and those who had retired. The comparisons were done in relation to different job categories (ie, work with mainly physical, combined physical and mental, and mainly mental demands).

Measurement of disease

The health of the subjects was assessed and based on the number of reported diseases and the perception of health reported in the questionnaire. The presence of diseases was based on a general question on the presence of a chronic disease, one on the presence of impairment or injury, and also on a list of specific diseases that had been diagnosed by a physician. Based on the comprehensive list of diagnosed diseases (51 diseases), a dichotomous classification of the presence of cardiovascular, musculoskeletal, respiratory, and mental diseases was formed. Furthermore, the number of diseases was transformed into a quantitative variable of 3 classes: no diseases, 1 or 2 diseases, and 3 diseases or more. From our previous studies, we concluded that the diseases reported in the questionnaire corresponded fairly well with those diagnosed by a physician (18).

Measurement of perceived health

Both in 1981 and 1992 the questionnaires included similar questions on the following 2 aspects of perceived health: (i) a subjective assessment of health as compared with that of persons of the same age (much better, slightly better, equal to, slightly worse and much worse) and (ii) the extent to which diseases hamper everyday life (not at all, relatively little, to some extent, rather much and very much).

The responses were combined as follows: good perceived health was reported by persons who considered their health to be much better or slightly better than

subjects of the same age and, in addition, stated that diseases did not affect their daily life or did so relatively little (group A, table 1). Poor health was reported by persons who considered their health to be worse than that of subjects of the same age and who stated that diseases affected their daily life rather much or very much (group D, table 1). Average perceived health was reported by persons whose answers could be grouped into category B in table 1, and slightly reduced perceived health was reported by persons who described one variable as neutral and the other as negative (group C, table 1). When information was missing, the category was assigned the value of the other variable.

Each group included the following number of subjects: group A (good health): 380 (8%) in 1981 and 846 (19%) in 1992; group B (average health): 1207 (27%) in 1981 and 1144 (25%) in 1992; group C (declined health): 2285 (50%) in 1981 and 1681 (37%) in 1982, and group D (poor health): 662 (15%) in 1981 and 863 (19%) in 1992.

Measurement of changes in perceived health

The results presented and analyzed were based on the relative frequency of different variables. The changes in the prevalence of diseases and perceived health were tested with Pearson's chi-square independence test. Both the improvement and decline in perceived health between 1981 and 1992 were analyzed by logistic regression models. For this purpose a new 4-class variable, namely, change in perceived health, was constructed as follows: group 1 (remained healthy): 1015 persons (22%); group 2 (improved health): 975 persons (22%); group 3 (declined health): 572 persons (13%); and group 4 (remained poor health): 1972 persons (43%).

Logistic regression analyses were performed on 2 groups. The first comprised the persons who had good or average health in 1981, and the focus was on explaining the decline in perceived health (groups 1 and 3). Next we analyzed the variables that represented those whose health remained poor (group 4) compared with those whose health had improved (group 2) during the follow-up period.

The analyses were performed in 2 steps. First, a stepwise logistic regression analysis was carried out with the base-line questionnaire variables of life-style (hobbies, smoking, vigorous physical exercise), satisfaction with work and life, frequent disorders, and some background factors (gender, age, and work content). The most significant variables ($P < 0.10$) were chosen for the final logistic regression model. Preliminary analyses were performed using the SAS logistic procedure and the final logistic analyses with the EGRET statistics package by the Statistics and Epidemiology Research Corporation.

Results

Prevalence of diseases

The prevalence of cardiovascular, musculoskeletal, respiratory, and mental diseases diagnosed by a physician increased during the 11-year follow-up (table 2). There were no significant differences between the men and women in 1981, but in 1992 musculoskeletal diseases were reported by 53% of the women (38% in 1981) and 49% of the men (35% in 1981). Cardiovascular diseases were reported by 28% of the women (15% in 1981) and by 37% of the men (19% in 1981). Respiratory diseases

Table 1. Forming of different groups of self-perceived health. (A = good health, B = average health, C = declined health, D = poor health)

Assessment of health compared with that of others the same age	To what extent do diseases disturb daily life				
	Not at all	Relatively little	To some extent	Rather much	Very much
Much better	A	A	B	B	B
Slightly better	A	A	B	B	B
Equal to age mates	B	B	C	C	C
Slightly worse	B	B	C	D	D
Much worse	B	B	C	D	D

Table 2. Prevalences (%) of the most common diseases in 1981 and 1992 among the men and women by 1981 age groups. The changes in the prevalence rates were calculated by Pearson's chi-square test.

Gender	N	Musculoskeletal disease			Cardiovascular disease			Respiratory disease			Mental disorder		
		1981	1992	P-value	1981	1992	P-value	1981	1992	P-value	1981	1992	P-value
Men	1877	35	49		19	37		9	13		4	5	
44—48 years	602	27	50	< 0.001	15	33	< 0.001	9	13	0.014	5	5	0.794
49—53 years	823	37	48	< 0.001	19	38	< 0.001	10	13	0.043	4	5	0.191
54—58 years	452	41	49	0.023	25	39	< 0.001	9	14	0.017	4	3	0.361
Women	2657	38	53		15	28		10	14		4	7	
44—48 years	895	31	56	< 0.001	11	26	< 0.001	9	15	0.001	4	7	0.001
49—53 years	1106	38	51	< 0.001	16	28	< 0.001	10	14	0.022	3	7	< 0.001
54—58 years	656	46	51	0.109	21	29	0.001	12	13	0.558	4	5	0.792
Total	4534	37	51		17	31		10	14		4	6	

Table 3. Prevalences (%) of the most common diseases in 1981 and 1992 by the type of work done in 1981 (physically demanding, both physically and mentally demanding and mentally demanding) and the work status in 1992. The changes in the prevalence rates were calculated by Pearsons's chi-square test.

Work status	N	Musculoskeletal disease			Cardiovascular disease			Respiratory disease			Mental disorder		
		1981	1992	P-value	1981	1992	P-value	1981	1992	P-value	1981	1992	P-value
Same occupation as in 1981	924	23	45		8	23		5	11		3	4	
Physical work	311	26	50	< 0.001	10	26	< 0.001	5	12	0.004	3	4	0.824
Mixed physical and mental work	208	28	49	< 0.001	8	20	< 0.001	8	9	0.727	3	4	0.793
Mental work	405	19	40	< 0.001	7	23	< 0.001	4	11	< 0.001	3	4	0.442
Retired due to old age	2049	35	44		17	27		9	10		3	3	
Physical work	648	39	48	0.001	19	27	0.001	10	10	0.645	3	4	0.448
Mixed physical and mental work	845	38	46	< 0.001	16	28	< 0.001	10	11	0.389	3	3	0.887
Mental work	556	28	38	< 0.001	15	28	< 0.001	8	9	0.584	3	1	0.020
Retired due to disability	1384	49	67		25	43		14	21		6	12	
Physical work	714	52	70	< 0.001	26	44	< 0.001	15	23	< 0.001	5	11	< 0.001
Mixed physical and mental work	328	53	70	< 0.001	20	39	< 0.001	15	20	0.064	7	12	0.030
Mental work	342	39	58	< 0.001	27	44	< 0.001	13	17	0.198	8	15	0.002
Total	4534	37	51		17	31		10	14		4	6	

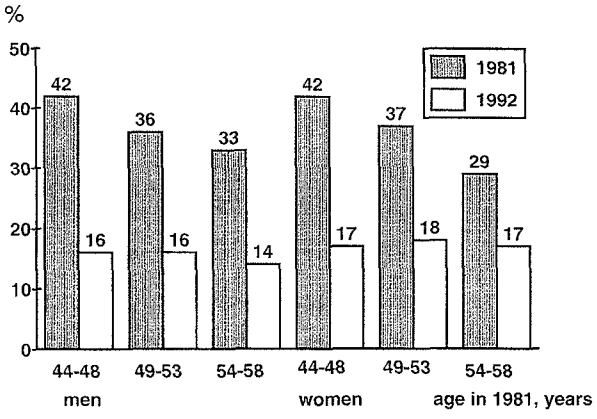

Figure 1. Proportion of healthy (no diseases diagnosed by a physician) subjects in 1981 and 1992 by gender and age group.

rose by 4% among both the men and the women, but mental disturbances increased more among the women (3%) than the men (1%). There was a statistically significant increase in the prevalence of disease between 1981 and 1992 ($P<0.05$) both for the men and for the women in all the age categories, with 2 exceptions. Among the women aged 54—58 years in 1981, only cardiovascular diseases increased significantly, and among the men the increase in mental disturbances was not statistically significant.

In 1981 musculoskeletal and cardiovascular diseases were more frequent in the older age groups. However, in 1992 the differences had leveled off, and no significant differences between the age groups were observed — in fact, musculoskeletal diseases had become more frequent in the younger than in the older age groups.

Subjects working in mentally demanding work had a significantly lower prevalence of musculoskeletal diseases (58%) than the other work demand groups did (70%) (table 3). The prevalence of musculoskeletal and cardiovascular diseases for subjects continuing in their old jobs had doubled in all the work demand groups. The work demand category in 1981 influenced the prevalence of disease even after retirement. Subjects who retired from mentally demanding work had about 10% fewer musculoskeletal diseases than the subjects who retired from the other work demand groups.

Because health was defined as the absence of disease, we also studied the workers who in 1981 had no diagnosed disease. In 1981 the proportion of "completely" healthy subjects decreased with age, among the women from 42% in the youngest to 29% in the oldest age group (figure 1). During the follow-up the proportion of "completely" healthy subjects decreased to below 20% in all the groups. However, age was no longer associated with absence of disease.

Perceived health

The assessment of subjective health improved remarkably during the follow-up period. The proportion of subjects reporting their health as good doubled to about 20% in 1992 among both the men and the women. The increase was 3-fold for the 54 to 58-year-old men, from 6% to 21% (table 4). The proportion of subjects with perceived poor health also increased between 1981 and 1992, for the women from 13% to 17% and for men from 16% to 21%. In the youngest age group the prevalence of poor health had doubled during the follow-up. A polarization of differences in perceived health occurred during this period. There was one exception, however. In the oldest age group the proportion of subjects with poor health decreased. The changes in perceived health were

statistically significant ($P<0.001$) in all the age groups among both the men and the women.

The relative increase of subjects with good health during the follow-up appeared to be associated with a decrease of subjects experiencing declined health. The proportion with declined health was 50% in 1981 and 37% in 1992. On the other hand, if health was perceived as poor in 1981, it remained so also in 1992.

The manner in which the subjects' perceived health changed was strongly influenced by work demands, the continuation of work, and retirement. The proportion of subjects with good health who were working in mainly mentally demanding jobs was twice that of subjects working in mainly physically demanding jobs (table 5). This difference persisted even after retirement. The perceived health improved during the follow-up both among the subjects continuing to work in their previous jobs and among the retired subjects. The health of the subjects on disability pension had been poor in 1981, and the proportion of subjects with poor perceived health increased slightly in all the work demand groups. The differences in perceived health also increased. In all the groups, the proportion of subjects in the extreme classes increased. The change was towards good health for the subjects who continued to work in their previous jobs, as well as for the old-age pensioners, while for the subjects on disability pension there was a shift towards poor health. The changes in perceived health were statistically significant ($P < 0.05$) for all types of work.

Disease and perceived health

As mentioned earlier, the number of diseases increased with age; nevertheless the perceived health appeared to improve during the follow-up period. Table 6 shows the perceived health in relation to the number of diagnosed diseases. Among the subjects who had 0—2 diagnosed diseases in 1981, only 10% experienced their health as good. In 1992, however, 42% of those who did not have any diagnosed diseases perceived their health as good. One-fourth of the subjects with 1 or 2 diseases in 1992 perceived their health as good.

The subjects who did not have any disease in 1981 (figure 2) provide a better picture of the association

Table 4. Distribution (%) of perceived health into different health categories in 1981 and 1992 for the men and the women by 1981 age groups. The changes in rates were calculated by Pearson's chi-square test.

Gender	N	1981				1992				P-value
		Good	Average	Decreased	Poor	Good	Average	Decreased	Poor	
Men	1877	7	25	52	16	17	24	37	21	
44—48 years	602	8	25	54	13	16	18	39	27	< 0.001
49—53 years	823	6	25	53	16	15	29	36	20	< 0.001
54—58 years	452	6	24	49	21	21	25	37	17	< 0.001
Women	2657	10	28	49	13	20	26	37	17	
44—48 years	895	9	29	51	11	18	23	36	22	< 0.001
49—53 years	1106	9	28	49	14	21	26	37	16	< 0.001
54—58 years	656	11	27	45	16	20	29	38	13	< 0.001
Total	4534	8	27	50	15	19	25	37	19	

Table 5. Distribution (%) of perceived health into different health categories by the type of work done in 1981 (physically demanding, both physically demanding and mentally demanding and mentally demanding) and the work status in 1992. The changes in rates were calculated by Pearson's chi-square test.

Work status	N	1981				1992				P-value
		Good	Average	Decreased	Poor	Good	Average	Decreased	Poor	
Same occupation as in 1981	924	10	31	54	5	24	27	39	10	
Physical work	311	8	23	60	8	15	24	47	14	0.001
Mixed physical and mental work	208	12	31	50	6	25	26	37	12	< 0.001
Mental work	405	11	37	50	2	30	29	35	6	< 0.001
Retired due to old age	2049	10	30	50	10	26	33	34	8	
Physical work	648	7	25	56	12	18	34	41	8	< 0.001
Mixed physical and mental work	845	10	29	48	12	26	32	33	9	< 0.001
Mental work	556	13	37	44	5	34	33	27	6	< 0.001
Retired due to disability	1348	4	17	50	29	4	12	41	42	
Physical work	714	2	16	51	31	2	12	40	45	< 0.001
Mixed physical and mental work	328	3	15	47	33	5	10	42	45	0.018
Mental work	342	8	22	49	21	7	15	43	35	0.001
Total	4534	8	27	50	15	19	25	37	19	

Table 6. Distribution (%) of perceived health into different health categories by the number of diseases diagnosed by a physician in 1981 and 1992.

Perceived health	1981			1992		
	No diseases	1—2 diseases	≥ 3 diseases	No diseases	1—2 diseases	≥ 3 diseases
Good	11	10	3	42	25	7
Average	32	33	13	33	32	18
Decreased	54	47	49	24	34	44
Poor	2	10	35	1	10	31
Total						
Percent	100	100	100	100	100	100
Number	1670	1518	1346	756	1503	2275

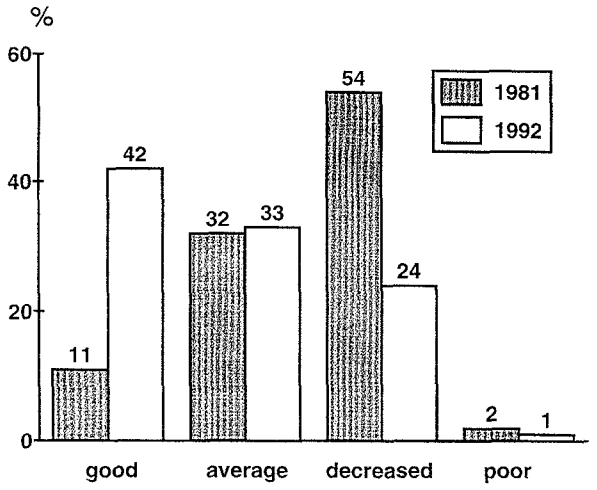

Figure 2. Distribution of perceived health in 1981 and 1992 among the subjects who had no diseases diagnosed by a physician.

between perceived health and disease. From 1981 to 1992 the number of subjects perceiving their health as good increased almost 4-fold and the number of those who experienced a slight decline in their health decreased by about 50%. There were no changes in the other groups.

The number of persons experiencing good health but suffering from musculoskeletal, cardiovascular, or respiratory diseases doubled during the follow-up. If a mental disease was reported, the proportion of good health remained the same during the follow-up. All these proportions were small, however (table 7).

Prediction of changes in perceived health

The last of our objectives was to determine which variables of life-style, satisfaction, and health in 1981 predicted an improvement or a decline in perceived health. A decline in perceived health (groups 1 and 3) was best predicted by the number of diseases diagnosed by a physician. If there were 3 diseases, the "risk" of decline in perceived health was 10-fold [odds ratio (OR) 10.6] compared with the subjects with no diagnosed disease (table 8). Smoking, physically demanding work, and the presence of cardiovascular disease increased this decline (OR 1.5). Satisfaction with life was a significant factor in that even slight uncertainty of one's satisfaction predicted a decline in health. On the contrary, pursuing vigorous physical activity at least twice a week during leisure time prevented a decline in health. Age also seemed to be inversely associated with a decline in perceived health.

In the study of factors that predicted an improvement in perceived health (groups 2 and 4), the model included more explanatory variables. Three or more diagnosed diseases was the strongest variable that prevented an improvement in health perception (OR 0.2). Variables with the same effect were, among others, the presence of musculoskeletal disease (OR 0.7) or cardiovascular disease (OR 0.7) and mainly physically demanding work (OR 0.7).

The assessment of one's life situation was a better predictor of the change in perceived health than in the model of declined health. Subjects with an unsatisfactory

Table 7. Distribution (%) of perceived health into different health categories by the most common disease groups in 1981 and 1992.

Perceived health	Musculoskeletal disease		Cardiovascular disease		Respiratory disease		Mental disorder	
	1981	1992	1981	1992	1981	1992	1981	1992
Good	4	10	4	9	3	8	3	3
Average	16	20	21	20	21	19	14	12
Decreased	50	43	46	42	46	39	40	39
Poor	30	27	28	29	33	34	42	46
Total								
Percent	100	100	100	100	100	100	100	100
Number	1656	2320	774	1423	453	618	182	263

life situation displayed only half of the probability (OR 0.5) for improvement in health when compared with that of satisfied subjects (table 9). The role of fascinating hobbies was accentuated in this model in addition to satisfaction with one's life situation. If, after a workday, there was no enthusiasm for pastimes, the probability of an improvement in perceived health was smaller (OR 0.7). Physical activity during leisure time improved perceived health. In addition older people often perceived their health as improved.

Discussion

An increase in the number of diseases can be expected with advancing age. However, the increase in the number of persons who considered themselves healthy despite aging needs further analysis. This result was unexpected because, during our 4-year follow-up, perceived health decreased slightly between 1981 and 1985 (16). This trend had changed after 1985. The key question is whether this improvement in perceived health is associated with aging or with external factors linked to the study period of 1985—1992 (ie, whether it is mainly a period effect). Has, for instance, the economic depression which began in the early 1990s played some role? The answer is probably yes. But an economic recession was predicted also in early 1981, and this prediction influenced the opinions of people. They were seeking security from family life, and individuality was emphasized. The same features were present in the beginning of the 1990s, although this time they were much stronger than 11 years earlier. It has been suggested that the emphasis on individuality created a new interest in oneself and in health (19).

There is also evidence that the general health of the Finnish population has improved during the last few decades. In studies on health and the health behavior of adults since 1978, the proportion of 54- to 64-year-old people who consider their health as poor has decreased, among the men from 27% to 17% and among the women from 21% to 14% in 1993. Thus the noted improvement in perceived health can at least partly be explained by a true change in the health of the general population (20, 21).

The timing of our cross-sectional study allowed 3 out of 4 workers to leave work before the last questionnaire. Particularly the workers on disability pension formed a group of their own that was characterized by perceived poor health and numerous diseases. This finding was anticipated because the legislation on disability pensions requires the presence of a disease, impairment, or injury causing a decreased ability to work as the basis for disability pension. Thus applications for disability pensions

Table 8. Logistic regression analysis explaining the decrease in perceived health (groups 1 and 3) in 1981—1992. (OR = odds ratio, 95% CI = 95% confidence interval)

Variable	OR	95% CI
Age (years)	0.9***	0.89—0.95
Satisfaction with the life situation		
Very or quite satisfied	1	
Not satisfied but not unsatisfied either	1.7*	1.06—2.61
Very or quite unsatisfied	0.6	0.27—1.28
Physical exercise		
Once a week at most	1	
At least twice a week	0.8*	0.61—0.98
Smoking		
Does not smoke	1	
Smokes	1.5***	1.24—1.92
Cardiovascular disease		
No	1	
Yes	1.5*	1.05—2.06
Physical work		
No	1	
Yes	1.5**	1.14—1.87
Diseases diagnosed by a physician		
No diseases	1	
Two diseases at most	3.3***	2.25—4.87
Three or more diseases	10.6***	7.25—15.57

*P < 0.05, **P < 0.01, ***P < 0.001.

Table 9. Logistic regression analysis explaining the increase in perceived health (groups 2 and 4) in 1981—1992. (OR = odds ratio, 95% CI = 95% confidence interval).

Variable	OR	95% CI
Age, years	1.1***	1.03—1.08
Satisfaction with the life situation		
Very or quite satisfied	1	
Not satisfied but not unsatisfied either	0.7**	0.51—0.86
Very or quite unsatisfied	0.5***	0.31—0.74
Physical exercise		
Once a week at most	1	
At least two times a week	1.3*	1.04—1.53
Hobbies after work hours		
Yes	1	
Hard to say	0.6**	0.47—0.87
No	0.7**	0.60—0.90
Smoking		
Does not smoke	1	
Smokes	0.9*	0.74—0.99
Musculoskeletal disease		
No	1	
Yes	0.7***	0.61—0.88
Cardiovascular disease		
No	1	
Yes	0.7**	0.54—0.88
Physical work		
No	1	
Yes	0.7***	0.55—0.79
Diseases diagnosed by a physician		
No diseases	1	
Two diseases at most	0.6***	0.44—0.73
Three diseases or more	0.2***	0.13—0.22

*P < 0.05, **P < 0.01, *** P < 0.001.

are initiated by perceived poor health. On the other hand, the difference in health between those continuing to work in their previous job and those retiring normally on an old-age pension was very small, although the subjects continuing to work experienced their health as poorer. The subjects who retired normally between 1981 and 1992 reported more common diseases in 1981 (due to old age) than those who continued to work, but in 1992 the prevalence of diseases was about the same. From 1981 to 1992 the pattern of change differed between the age groups. In the first questionnaire the prevalence of disease increased from the youngest to the oldest age group, but in 1992 no such trend could be observed.

On the other hand, a distinct trend in this study was the polarization of subjective health-related responses. The proportion of those considering their health as good increased, but also the proportion of those considering their health as poor increased. This finding was true mostly among the men. It may reflect a general characteristic of aging, namely, an increase in variability (22, 23).

The most surprising result of our study was that the association between the number of diagnosed diseases and perceived health had changed between 1981 and 1992. In 1981 perceived health was not related to the number of diseases, whereas in 1992 particularly the absence of disease was strongly associated with good perceived health. It is tempting to interpret this change as a consequence of the change in attitude towards oneself during aging; the perception of health becomes more disease-centered. This possibility congrues with the hypothesis of gerotranscendence, according to which aging brings about a change towards oneself and towards one's surroundings (24).

Another possibility is that the criteria for perceived good health become lower during aging. This phenomenon can be explained by theories concerning reference group and coping (12). According to the theory concerning reference group, people assess their own situation by comparing themselves with a peer group. When one compares one's health with that of a group of similar age (and not younger persons), it is easier to experience one's own situation more positively. According to the coping theories, aging helps one to adapt to ailments that are a part of the life of elderly people (12, 25).

The assessment of perceived health in our study came close to the views of the reference group theory. The subjects were asked to compare their health directly with persons of the same age. This request probably facilitated the assessment. A defined comparison group is important because health has a different meaning for different people (11).

Occasional reports (9) have shown that perceived health and diseases diagnosed by a physician represent different phenomena. The perception of health is associated with general functional capacity and well-being, whereas a single disease has more restricted consequences. These associations warrant further study. It is evident that the presence of disease and perceived health reflect the same phenomenon.

The logistic models revealed predictors of perceived health. Although the presence of diseases was the best predictor, some life-style factors were also included in the models. Being physically active during leisure time and being a nonsmoker improved the outcome points for the beneficial role of "healthy" life-style factors. Their significance may seem less important because life-style factors are associated with cardiovascular diseases and some of the effects can be considered an absence of these specific diseases. The role of life satisfaction and time for pursuing hobbies suggests that also psychological factors are important for maintaining health. The logistic models also suggest that a holistic approach must be emphasized in the study of health.

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