

Prevalence and incidence rates of diseases and work ability in different work categories of municipal occupations

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TUOMI K, ILMARINEN J, ESKELINEN L, JÄRVINEN E, TOIKKANEN J, KLOCKARS M. Prevalence and incidence rates of diseases and work ability in different work categories of municipal occupations. *Scand J Work Environ Health* 1991;17(suppl 1):67-74. The purpose of this study was determine the relationship between the health status and work ability of individuals representing a variety of municipal occupations. In both 1981 and 1985, 4255 employees answered a postal questionnaire. The subjects, aged 44-58 years in 1981, were grouped into physical, mental, or mixed physical and mental job categories. Occupational groups with a high disease prevalence in 1981 had a high, and occupational groups with a low disease prevalence in 1981 a low, disease incidence during the follow-up period. In 1985 every second subject suffered from a musculoskeletal disease. The highest disease prevalence was observed for physically demanding occupations and for men in work with mixed physical and mental demands. Female auxiliary workers, domestic helpers and cooks, and also male installation and transport workers, had the poorest health. The men and women in mental work had the best health and work ability.

Key words: health status, municipal workers, occupation.

Aging is linked to the progressive deterioration of health and an increased susceptibility to disease. Statistics on disability pensions show that mental disturbances are present already among young people, whereas cardiovascular diseases appear in middle age (1). Generally speaking, physical capacity starts to weaken in middle age, although there is considerable individual variation. The best correlation has been observed between aging and an impairment of respiratory and cardiovascular capacity (2, 3).

In another study concerning the mortality and disability of our cohort, workers with cardiovascular and mental diseases had the highest disability pension rates (4). One-third of the subjects with cardiovascular disease and one-fourth of those with mental disease in 1981 had become disabled during the follow-up period, 1981-1985.

In the cross-sectional study of the cohort in 1981, marked differences were found in the health status and work ability of the subjects in different occupations. Disease was the most prevalent among auxiliary, home care, installation, and transportation workers, and work ability was also poor in these occupations (5).

The purpose of the present study was to compare the changes in health status and work ability among workers in municipal occupations. We asked whether, and to what extent, the health and fitness for work observed in the first cross-sectional study had changed during a four-year follow-up period. Possible changes in health and fitness for work were examined in light

of prevailing legislation for age of retirement from municipal occupations.

Subjects and methods

Altogether 4255 subjects who were employed and remained in the same municipal work participated in two questionnaire studies in 1981 and 1985. According to a job analysis the 40 occupational groups were classified into 13 work profile groups and further into three work content categories (6). The mean age of the persons in the work content groups was 49 or 50 years, for both the men and the women (table 1).

Through the use of a questionnaire, which included data on 46 different diseases, we studied changes in health by calculating cumulative incidence rates in 1981-1985 and prevalence rates in 1981 and 1985. In this report diseases representing major causes of disability among municipal workers in Finland are presented.

Work ability was assessed with a work ability index. Its conceptual definition represented the question: "How good is the worker at present, in the near future, and how able is he or she to do his or her work with respect to work demands, health and mental resources?" The items of the work ability index are presented in table 2.

The work ability index was derived as the sum of the seven items. The range of the summative index was 7-49, which was classified into the following three groups: (i) poor work ability (score 7-27), (ii) moderate work ability (score 28-43), and (iii) good work ability (score 44-49). The cut-off points for poor and good work ability were chosen from the 15th percent-

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Table 1. Ages of the male and female municipal workers according to job content.

Work content	Men			Women		
	N	Mean age (years)	SD	N	Mean age (years)	SD
Physical	803	50	3.5	849	50	3.3
Mixed physical and mental	432	49	2.9	853	49	3.0
Mental	564	50	3.5	754	50	3.5
Total	1799	50	3.4	2456	50	3.5

Table 2. Work ability index.^a

Item	Scale	Explanation
1. Subjective estimation of present work ability compared with the lifetime best	1—10	0 = very poor 10 = very good
2. Subjective work ability in relation both to physical and to mental demands of the work	2—10	2 = very poor 10 = very good
3. Number of diagnosed diseases	1—7	1 = 5 or more diseases 2 = 4 diseases 3 = 3 diseases 4 = 2 diseases 5 = 1 diseases 7 = no disease
4. Subjective estimation of work impairment due to disease	1—6	1 = fully impaired 6 = no impairment
5. Sickness absence during past year	1—5	1 = 100 days or more 2 = 25—99 days 3 = 10—24 days 4 = 1—9 days 5 = 0 days
6. Own prognosis of work ability after two years	1, 4, 7	1 = hardly able to work 4 = not sure 7 = fairly sure
7. Psychological resources (enjoying daily tasks, activity and life spirit, optimistic about the future)	1—4	1 = very poor 4 = very good

^a Range 7—49 with poor work ability = 7—27, moderate work ability = 28—43, and good work ability = 44—49.

Table 3. Prevalence of musculoskeletal, cardiovascular, and mental disease in 1981 and 1985 and the cumulative incidence of these diseases in 1981—1985 for the men in the physical, mixed physical and mental, and mental work groups.

Type of disease	Physical work (N = 803)			Mixed work (N = 432)			Mental work (N = 564)		
	Prevalence 1981 (age 50 ^a) (%)	Prevalence 1985 (age 54 ^a) (%)	Incidence 1981—1985 (age 50—54 ^a) (%)	Prevalence 1981 (age 49 ^a) (%)	Prevalence 1985 (age 53 ^a) (%)	Incidence 1981—1985 (age 49—53 ^a) (%)	Prevalence 1981 (age 49—53 ^a) (%)	Prevalence 1985 (age 54 ^a) (%)	Incidence 1981—1985 (age 50—54 ^a) (%)
Musculoskeletal disease	36	50	32	37	48	27	25	38	24
Upper back, osteoarthritis	14	22	14	18	26	14	10	13	7
Lower back, osteoarthritis/sciatica	21	29	18	24	32	19	15	23	14
Osteoarthritis of the extremities	11	18	12	8	17	14	5	10	7
Cardiovascular disease	23	30	16	21	24	9	18	27	14
Ischemic heart disease	5	8	5	3	4	2	4	6	3
Arterial hypertension	15	19	8	17	18	6	12	18	8
Congestive heart failure	3	4	3	2	3	2	2	3	2
Mental disease	4	5	3	3	5	3	4	5	3

^a Mean age in years.

tile of the index distribution of the total population in 1981 (5).

Results

Tables 3 and 4 show the prevalences of musculoskeletal, cardiovascular, and mental diseases in 1981 and 1985 and the incidence of these diseases during the follow-up period of 1981–1985 among the men and the women.

In 1981 every third, and in 1985 every second, man and woman reported the presence of a diagnosed musculoskeletal disease. The prevalence rates of musculoskeletal disease were systematically higher among those in physical or mixed physical and mental work than in mental work among both the men and the women.

In 1981 every fifth, and in 1985 every fourth, man and woman reported the presence of a diagnosed cardiovascular disease. The prevalence rates of cardiovascular diseases in 1985 were higher in the physical and mental work categories than in the mixed category for both the men and the women.

The prevalence rates of reported mental disease were low. In 1985, 5 % of the men and 6 % of the women reported mental disease in the physical, mixed, and mental work categories.

The cumulative incidence rates of musculoskeletal diseases over four years were highest in the physical (45 %) and lowest in the mental (27 %) work categories. The incidence rate for cardiovascular diseases was about the same (13–14 %) in all three categories. The mental disease incidence rate was also on the same level (4–5 %) in the three work content groups.

Men in physical work suffered often from ischemic heart disease. Men doing work with mixed physical and

mental demands reported degenerative spondyloarthropathy of the lower back and also sciatica. They also often suffered from the presence of cervical spondylarthritis. Work content did not relate to the presence of mental disease. Women in physical work suffered particularly often from degenerative arthropathy of the upper back and shoulder regions and of degenerative joint disease in the extremities. The men and women in mental work had the best health according to the prevalence and incidence rates (tables 3 and 4).

Among the men in physical work, diseases occurred in most of the occupational groups, for example, janitors, carpenters, and painters (table 5). In job categories with mixed demands the poorest health was seen among dump workers, machine operators, and bus drivers. Supervisors at construction sites, social workers, and fire chiefs had the highest disease rates among the men in mental work. These trends were found for both the prevalence and incidence rates, and they concerned musculoskeletal, cardiovascular, and also other diseases. These occupational groups suffered from the same diseases already in 1981.

The various diseases were generally present in all the occupational groups of women in physical work, including bathers, domestic helpers and housekeepers, hospital aides, construction workers and streetsweepers, and cleaners (table 6). The poorest health among the women in mixed physical and mental work occurred among the cooks, practical nurses, child care workers, and psychiatric nurses. Among the women doing primarily mental work, typists and vocational school teachers had the highest disease rates.

Poor work ability was present the most often in occupations with physical work demands and also among the men in mixed physical and mental work. The men and women employed in mental work reported the best

Table 4. Prevalence of musculoskeletal, cardiovascular, and mental disease in 1981 and 1985 and the cumulative incidence of these diseases in 1981–1985 for the women in the physical, mixed physical and mental, and mental work groups.

Type of disease	Physical work (N = 849)			Mixed work (N = 853)			Mental work (N = 754)		
	Prevalence 1981 (age 50 ^a) (%)	Prevalence 1985 (age 54 ^a) (%)	Incidence 1981–1985 (age 50–54 ^a) (%)	Prevalence 1981 (age 49 ^a) (%)	Prevalence 1985 (age 53 ^a) (%)	Incidence 1981–1985 (age 49–53 ^a) (%)	Prevalence 1981 (age 49–53 ^a) (%)	Prevalence 1985 (age 54 ^a) (%)	Incidence 1981–1985 (age 50–54 ^a) (%)
Musculoskeletal disease	42	60	45	36	50	31	32	44	27
Upper back, osteoarthritis	22	35	25	16	23	12	14	22	14
Lower back, osteoarthritis/sciatica	23	32	21	23	31	17	18	22	12
Osteoarthritis of the extremities	18	28	23	12	20	14	9	17	12
Cardiovascular disease	23	27	14	16	22	13	18	25	13
Ischemic heart disease	2	3	3	2	3	2	2	2	1
Arterial hypertension	15	18	7	10	13	6	13	17	7
Congestive heart failure	3	4	2	1	1	1	2	2	1
Mental disease	4	6	4	3	6	5	3	6	5

^a Mean age in years.

Table 5. Prevalence of musculoskeletal and cardiovascular diseases in 1981 and 1985 and the cumulative incidence of these diseases in 1981–1985 for the men according to the work content and job profile groups, and also occupation.

Work content group	N	Musculoskeletal diseases			Cardiovascular diseases		
		Prevalence 1981 (%)	Prevalence 1985 (%)	Incidence 1981–1985 (%)	Prevalence 1981 (%)	Prevalence 1985 (%)	Incidence 1981–1985 (%)
Physical work	803	36	50	32	23	30	16
Auxiliary work	260	33	45	29	28	32	14
Unskilled assistants	14	7	36	31	29	43	20
Painters	53	32	51	33	25	34	15
Construction workers and streetsweepers	105	33	43	27	27	27	13
Park workers	55	44	49	26	29	36	13
Laborers	33	27	36	29	36	33	19
Installation work	543	37	53	34	21	30	16
Firemen	57	39	39	18	14	21	10
Janitors	117	33	48	37	21	32	19
Mechanic and pipe fitters	102	35	52	32	20	23	7
Car mechanics	63	44	59	26	18	19	10
Carpenters	90	44	62	44	26	36	19
Electricians	114	36	54	36	25	40	26
Mixed physical and mental work	432	37	48	27	21	24	9
Transport work	351	38	48	28	21	24	10
Machine operators	243	41	49	29	24	25	10
Bus drivers	101	33	47	25	16	23	11
Other transport workers	7	29	57	40	14	14	—
Dump work							
Dump workers	16	44	63	33	25	25	17
Dental work	11	36	46	29	18	27	11
Dentists	11	36	46	29	18	27	11
Nursing work	52	31	40	17	20	21	2
Psychiatric nurses	52	31	40	17	20	21	2
Mental work	564	25	38	24	18	27	14
Administrative work	150	25	39	23	19	27	14
Social workers	15	33	47	30	33	40	10
Office supervisors	132	24	37	22	17	26	15
Technical supervision	146	21	42	29	22	34	18
Fire chiefs	6	17	83	80	—	17	17
Supervisors at construction site	139	21	40	26	23	34	17
Physician's work	52	14	25	24	2	12	12
Physicians	52	14	25	24	2	12	12
Teaching work	207	29	37	20	19	26	12
Vocational school teachers	143	31	41	22	20	26	12
Secondary school teachers	63	24	30	16	16	25	11
Total	1799	33	46	28	21	28	14

work ability. In the mental work category the male social workers and the female vocational school teachers reported poor work ability the most often. Figure 1 shows the percentage of workers with poor work ability in different occupations.

Table 7 presents a summary of work ability and the prevalence of disease for the different work profile groups. Auxiliary, home care, transportation, and dump work belonged to the poor work ability category in both 1981 and 1985. Installation work and kitchen supervision belonged to the poor work ability category only in 1985. In 1981 installation work had belonged to the class of good ability and high disease prevalence, and kitchen supervision to the class of good work ability and low disease prevalence. Nursing, administration, and the work of physicians and male teachers was found in the best category in both 1981 and 1985. Female teachers had belonged to this category in 1981, but during the follow-up their class changed to that of good work ability and high disease

prevalence. Office work, technical supervision, and dental work remained in the same category in 1981 and 1985. During the four years of follow-up, rather few changes in health and work ability occurred in the different occupational groups. None of the profile groups changed in a positive direction during the four years of follow-up.

Discussion

Among municipal workers the variation in physical and/or mental demands is great in different job categories. The self-estimated work ability and the prevalence of disease also differs greatly. In jobs with primarily physical demands we observed the poorest health and work ability in the first cross-sectional study of the present cohort in 1981 (5). Previous epidemiologic studies have also shown a high disease prevalence among workers in physically loading jobs (7).

Table 6. Prevalence of musculoskeletal and cardiovascular diseases in 1981 and 1985 and the cumulative incidence of these diseases in 1981–1985 for the women according to the work content and job profile groups, and also occupation.

Work content group	N	Musculoskeletal diseases			Cardiovascular diseases		
		Prevalence 1981 (%)	Prevalence 1985 (%)	Incidence 1981–1985 (%)	Prevalence 1981 (%)	Prevalence 1985 (%)	Incidence 1981–1985 (%)
Physical work	849	42	60	45	23	27	14
Auxiliary work	504	41	58	42	22	26	13
Cleaners	125	45	60	46	21	26	13
Hospital aides	160	45	64	48	20	21	10
Kitchen helpers	129	42	50	32	23	30	16
Construction workers and streetsweepers	54	30	56	45	30	28	8
Park workers	36	28	47	35	19	31	21
Home care work	343	44	64	50	23	28	15
Bathers	85	34	71	55	19	19	7
Domestic helpers and housekeepers	258	62	48	24	24	31	17
Mixed physical and metal work	853	36	50	40	16	22	13
Kitchen supervision	127	34	57	41	17	30	23
Cooks	127	34	57	41	17	30	23
Dental work	65	45	55	36	14	14	7
Dentists	65	45	55	36	14	14	7
Nursing work	660	36	47	28	16	22	12
Child care workers	184	42	57	29	21	22	10
Practical nurses	194	40	57	36	13	21	14
Psychiatric nurses	58	29	36	37	16	26	18
Nurses specialized in surgery	62	24	29	19	10	15	9
Other nurses	162	31	37	20	14	20	10
Mental work	754	32	44	27	18	25	13
Office work	269	38	49	30	20	28	14
Draftswomen	48	40	48	31	23	25	11
Typists	48	42	63	50	6	17	11
Office workers	173	37	48	27	23	32	15
Administrative work	293	25	39	25	17	21	9
Social workers	66	21	32	17	20	21	6
Head ward nurses	130	25	39	27	16	18	6
Head nurses	80	24	41	28	14	21	16
Office supervisors	17	41	59	30	24	35	23
Physician's work	22	14	36	32	9	9	—
Physicians	22	14	36	32	9	9	—
Teaching work	170	37	45	25	18	31	19
Vocational school teachers	56	34	41	22	16	30	19
Secondary subject teachers	16	25	38	25	13	19	7
Day care center teachers	98	40	50	27	20	33	22
Total	2456	37	53	35	19	25	13

Diseases of the musculoskeletal system prevailed, the complaints affecting more than half of the workers, followed by diseases of the cardiovascular system. Poor health was the most common for work profiles with physical demands among the women and in work with physical and mixed physical and mental demands among the men. The problem of musculoskeletal disease affecting workers in middle age has been repeatedly observed. The importance of mechanical factors as causes of these problems has been studied (8), but the occupational factors, such as sitting or standing (9), lifting and twisting (10, 11), or heavy manual work in general (12, 13), responsible for these chronic complaints are not definitely known. In addition to the effect of an occupation on the prevalence of musculoskeletal diseases, education and social class in general must be considered (14).

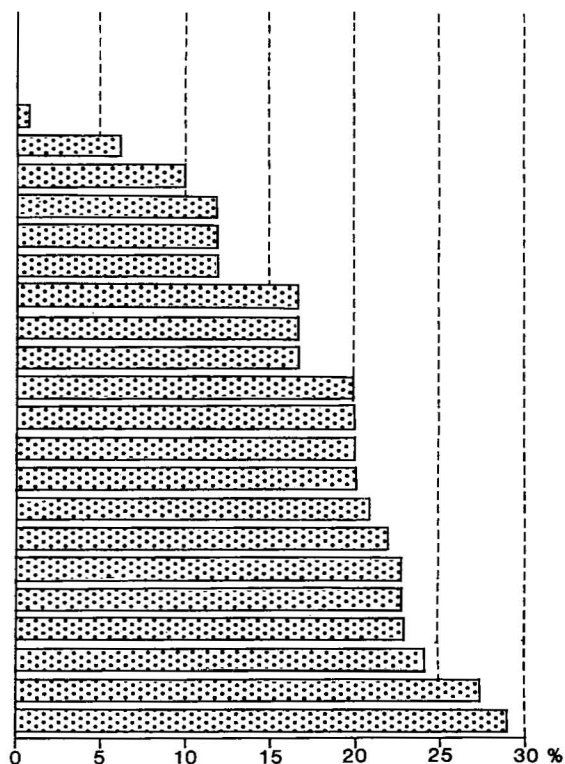
In work categories with fewer physical demands, such as in transportation (classified by us as mixed mental and physical work) and in jobs that demand

a sitting posture, a high prevalence of, for instance, sciatica and low-back trouble has been observed (9). It has also been shown that physically demanding work does not, by itself, create or maintain good physical work capacity (15, 16).

One purpose of our study was to estimate the stability of the results obtained in the first cross-sectional study of the cohort in 1981. We questioned the extent to which the results of one cross-sectional study can be relied upon. It was observed that, during four years of follow-up, the differences between occupations as regards work ability and the prevalence of disease remained stable. Although, as a result of aging, health and work ability changed for the worse, the trend was the same in the different occupational groups. This occurrence may be caused by the stability of work circumstances or by the similarity of change in different occupations. However, the workers frequently experienced their mental tasks as more straining than earlier (17). The change was observed particularly

men, mean 15.3 %

physician
fire chief
other transport worker
office supervisor
psychiatric nurse
secondary school teacher
janitor
supervisor at construction sites
vocational school teacher
dump worker
construction worker or streetsweeper
electrician
bus driver
machine operator
unskilled assistant
fireman
laborer
painter
mechanic or pipe fitter
carpenter
park worker
automobile mechanic
dentist
social worker



women, mean 15.1 %

physician
secondary school teacher
head nurse
office supervisor
head ward nurse
nurse specialized in surgery
other nurse
social worker
draftswoman
office worker
typist
dentist
day care center teacher
practical nurse
psychiatric nurse
child care worker
cook
hospital aide
cleaner
domestic helper or housekeeper
kitchen helper
construction worker or streetsweeper
vocational school teacher
bather
park worker

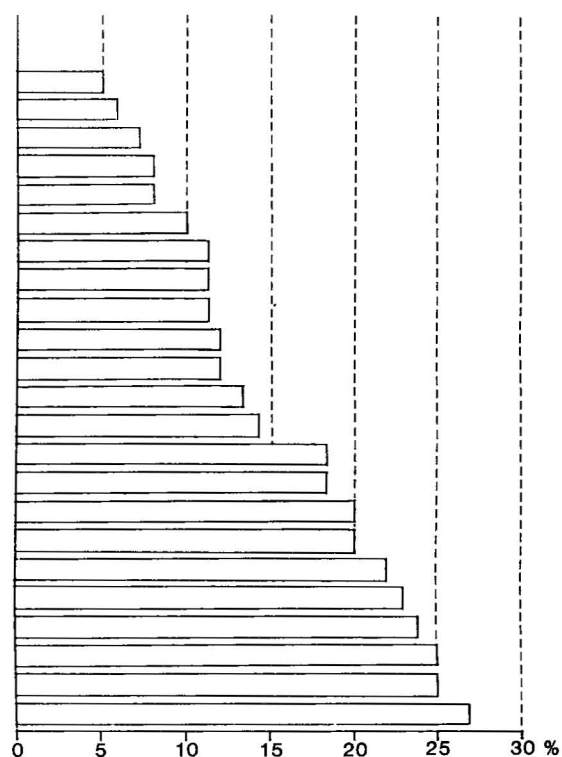


Figure 1. Percentage of the workers with a poor work ability according to gender and occupation.

Table 7. Work ability and disease prevalence by gender and work profile in 1985.

Work ability	Disease prevalence	Work profile	
		Men	Women
Poor ^a	High ^b	Auxiliary work Transport work Installation work Dump work	Home care work Auxiliary work Kitchen supervision
Good ^c	High ^b	Technical supervision	Teaching work Dental work Office work
Good ^c	Low ^d	Teaching work Nursing work Administrative work Physician's work	Nursing work Administrative work Physician's work

^a Poor work ability = work ability index the same or lower than the average.

^b High disease prevalence = musculoskeletal or cardiovascular prevalence rate the same or higher than the average.

^c Good work ability = work ability index higher than the average.

^d Low disease prevalence = musculoskeletal or cardiovascular prevalence rate lower than the average.

among the vocational school teachers. This finding is probably related to the increased demands for knowledge and postgraduate education among teachers. Cooks considered their confinement to their work area to be more strenuous than earlier, and installation workers felt that the physical loading of their work was more strenuous (17). Among these workers the decrease in health and work ability may be explained by changes and new demands in their work.

The combination of poor work ability and a high prevalence of musculoskeletal or cardiovascular diseases was found in the physically demanding profile groups already at the age of 50 years. It is obvious that these diseases affect work ability earlier and to a greater degree in physical work than in mental work.

The findings of this study suggest that the polarization of the work force into those working with decreased ability and those with a good work ability starts rather early, for example, at the age of 45 to 50 years. Once a person joins the group of workers with a poor work ability, the situation does not seem to change between 50 and 54 years of age if no intense measures are taken. In our study the women working in auxiliary or home care jobs and the men working in auxiliary and transport jobs encountered poor work ability at the age of 50 years at the latest and stayed there, at least up to the age of 54 years. It is to be expected that their health status continued to worsen, and the probability of their dropping out of worklife before receiving their old-age pension at the age of 63 years was remarkably high.

The polarization phenomenon raises the question of whether impaired health status and work ability can be affected by intense measures between the age of 45 and 55 years. It is obvious that the earlier preventive measures are taken, the better the effects. Therefore, measures to help auxiliary, home care, and transport workers should start as soon as the first signs of decreasing work ability are noticed. This need emphasizes the role of occupational health care personnel,

who are in the position to meet these employees regularly. More sensitive methods are needed, however, with which to assess the early signs of decreased ability. The work ability index, a subjective assessment of individual ability to work, seems to be one promising method for this purpose.

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