

Background and objectives of the Finnish research project on aging workers in municipal occupations

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ILMARINEN J, TUOMI K, ESKELINEN L, NYGÅRD C-H, HUUHTANEN P, KLOCKARS M. Background and objectives of the Finnish research project on aging workers in municipal occupations. *Scand J Work Environ Health* 1991;17(suppl 1):7-11. In Finland, the proportion of 45- to 64-year-old people in the work force is expected to increase from 31.1 to 40.1 % between 1980 and 2000. A multidisciplinary study was carried out to test the factors of work, health, work ability, functional capacity, and perceived strain as criteria for determining new concepts for retirement age. The first phase of the project comprised cross-sectional studies in which the age of the 6257 working subjects ranged from 45 to 58 years. The second phase covered a four-year follow-up of these same subjects. The main results of the 15 various studies are given in separate articles. Recommendations for improving the work and promoting the work ability of the aging worker have been made on the basis of the findings of the project.

Key terms: aging, health, mental capacity, physical capacity, retirement, strain, symptoms, work load, work ability.

Background of the project

The work force in many OECD (Organization for Economic Cooperation and Development) countries is undergoing remarkable demographic changes. The proportion of 45- to 64-year-old people in the work force (15-64 years) is expected to increase on an average from 32.0 to 41.3 % between 1980 and 2025 (1). In Finland this change is predicted to be even faster so that already at the turn of the century about 40.1 % of the work force will be older than 45 years (table 1). Finland, Sweden, Switzerland, Luxembourg, and Japan are expected to be the OECD countries with the oldest populations in the year 2000.

The proportion of those retired from the 15- to 64-year-old working population is also changing. There will be fewer working people than ever before for every retired person in the OECD countries. In Finland, where, in 1990, there were more than five employees for every retired person, the proportion will be 2.5 employed per retired person in 2030 (table 2).

Aging and the ability to work

There are remarkable individual differences in the rate of aging, and the temporal interaction of several environmental factors further increases these differences (2, 3). The best known changes are probably those that concern the functions of specific organs or organ systems (4-6). For example, aging is strongly associated with a decrease in cardiorespiratory capacity. Psycho-

Table 1. Proportion of 45- to 64-year-old persons in the work force (15-64 years of age) of the OECD countries (N = 24) and in Finland at different points in time (1). (OECD = Organization for Economic Cooperation and Development)

Year	OECD countries (%)	Finland (%)
1980	32.0	31.1
2000	35.5	40.1
2025	41.3	42.6

Table 2. Number of people of work age (15-64 years) in relation to the number of people retired in the OECD countries in 1990, 2010, and 2030. The countries have been ranked according to the estimate for 2030. (OECD = Organization for Economic Cooperation and Development)

Country	1990	2010	2030
Switzerland	4.6	3.2	2.1
Germany ^a	4.5	3.3	2.3
Finland	5.2	4.0	2.5
Austria	4.6	3.7	2.6
The Netherlands	5.4	4.5	2.6
Canada	6.0	4.7	2.7
Luxembourg	4.7	3.6	2.7
Denmark	4.4	4.1	2.7
France	4.8	4.1	2.8
Sweden	3.7	3.7	2.8
Italy	5.0	3.9	2.8
Belgium	4.7	4.2	3.0
Norway	4.0	4.5	3.0
Japan	6.2	3.4	3.1
United States	5.4	5.3	3.2
United Kingdom	4.4	4.5	3.2
Spain	5.2	4.4	3.2
Greece	5.5	3.9	3.2
New Zealand	6.2	5.7	3.3
Australia	6.0	5.4	3.4
Portugal	5.6	4.7	3.5
Ireland	5.4	6.1	4.4

^a Data from West Germany only.

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logical changes related to age can include difficulties in handling complex mental tasks and changes in emotional reactions. Life changes can be experienced in a more stressful manner than at younger ages, and changes can make older people more sensitive to disease (7–9). In general, however, mental performance has not been found to decrease essentially during work age, whereas an age-related weakening occurs in physical performance after middle-age (10). It is not known, however, to what extent the simultaneous increase in the prevalence rate of diseases is due to a normal aging process or to what extent it is due to abnormal interaction between the individual and his or her environment (2, 6, 11).

Changes in worklife

The rapid structural change that occurred in Finnish trade and industry in the 1960s and 1970s leveled off in the 1980s. Worklife, however, has continued to change, mostly because of the implementation of new technology. The proportion of officials and women in the work force is increasing, as is the number of occupations in what is called high technology. The use of new technology has changed the organization of work, the nature of work tasks, and the knowledge needed for new occupational skills.

The negative influences of new technology are characterized in many occupations by an increase in the number of workers exposed to chemical substances, an increase in one-sided physical or mental load, and

an increase in mental stress in general. On the other hand, positive effects can be expected due to a decrease in the number of work accidents, a decrease in harmful physical agents, and a decrease in heavy physical load. However, in spite of the technical development that has occurred, the work content of several occupations will not change essentially in the near future, especially in the case of many physically demanding occupations in which occupational health problems are already the most marked (12, 13).

New concepts for retirement

Since 1964 retirement ages have been job-dependent in Finnish municipal occupations. Eight different retirement ages exist, ranging from 53 to 62 years before the normal old age pension, which is granted at the age of 63 years. One of the key questions in the Local Government Pensions Institution was whether the stepwise increasing retirement ages were still relevant in the 1980s and, if not, what would be a better concept for retirement.

In an effort to study aging and work and to develop new concepts for retirement, a comprehensive and multidisciplinary research project was planned in the Institute of Occupational Health, Helsinki, Finland. Its overall objective was to determine whether the job-dependent retirement ages were still justified. The study objective also included the identification and testing of factors relevant to work and to retirement. The Local Government Pensions Institution sponsored the

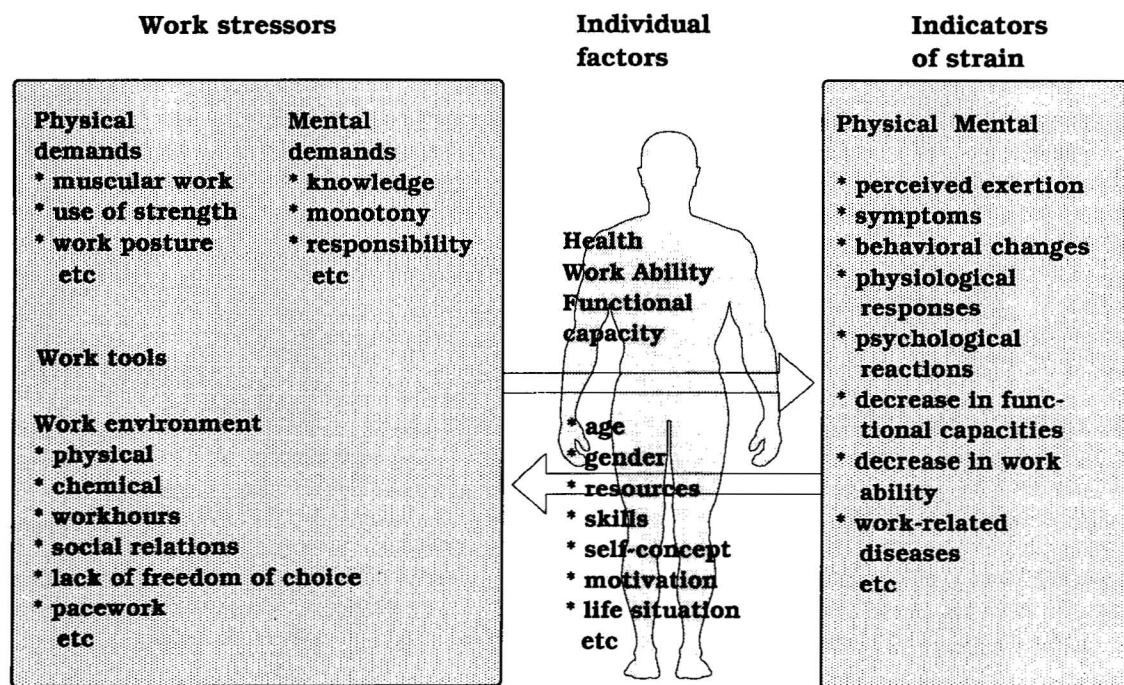


Figure 1. Stress-strain concept used as the framework in the cross-sectional and follow-up studies.

study, for which the cross-sectional data was gathered during 1981–1982. The preliminary results were reported in 1984–1985. During the study period, a governmental committee was established with the aim of redesigning retirement concepts. The results of the study were given to the committee.

Since 1986, when a law requiring an early individual retirement system was passed, the retirement system has been under reform in the Finnish private sector. According to this new concept, an individual disability pension can be granted if impairments, disabilities, handicaps, aging, heaviness of work, a poor work environment, or unfairness to continue to work can be established. The governmental and municipal sectors came under this law on 1 July 1989. The renewed retirement system corresponded in many aspects with the results of our project although our results led to an even stronger recommendation to consider both individual and job demands in determining work disability (14, 15).

Framework, objectives and outline of the project

The framework used in both the cross-sectional and the follow-up studies was the stress-strain concept (13, 16, 17). This model illustrates factors associated with the strain of the worker during occupational work (figure 1).

The strain experienced by the worker depends on work stressors and also on the individual characteristics and abilities of the worker. The stressors can be classified into physical and mental loads and into stressors caused by work tools and the work environment. During work the worker prepares the object(s) of his or her task to a predetermined condition by using both tool(s) and his or her own abilities.

The worker's ability is based on individual physical, mental, and social capacities. Such functional capacities illustrate human abilities and capacities and resources for handling daily routines and duties, whereas work ability is the worker's qualifications to manage occupational demands. If the work demands exceed the qualifications of the worker, overstrain is induced; if they are lower than the worker's resources, understrain will follow. Both conditions can also be the result of unsuitable work in relation to individual characteristics, as well as the result of a condition in which work is not perceived as meaningful and respected.

Strain may have either positive or harmful consequences. Harmful strain, according to the stress-strain concept, leads to acute or chronic physiological responses, psychological reactions, and behavioral changes. In the long run, such strain can decrease functional capacities, decrease work ability, and eventually lead to work-related diseases, which further increase the strain and finally disable the worker. In contrast a positive combination of work demands and indi-

vidual human abilities promotes health and work ability at any age.

The aim of the project was to clarify how work factors and factors of a worker's characteristics and a worker's perceived strain are related with age. The general objectives were as follows: (i) to test the factors of work, health, work ability, functional capacity, and perceived strain as criteria for determining retirement age and (ii) to develop a follow-up system of criteria relevant to retirement age.

The project had two phases. The first comprised the cross-sectional studies done in 1981 to obtain descriptive and base-line data on municipal occupations and municipal employees at an age (about 51 years) appropriate for the initial phase of a study on aging workers (figure 2). The second covered the four-year follow-up of various groups of these same employees (figure 3). The main results of the various studies can be found in the reports that follow this introduction to the project.

The cross-sectional investigations included a questionnaire study of retired employees (18), a clinical study for the validation of the questionnaire data (19), and two field studies (20, 21). The first field study analyzed the municipal jobs with a new field technique and the second analyzed the workers' stress and strain in different occupations.

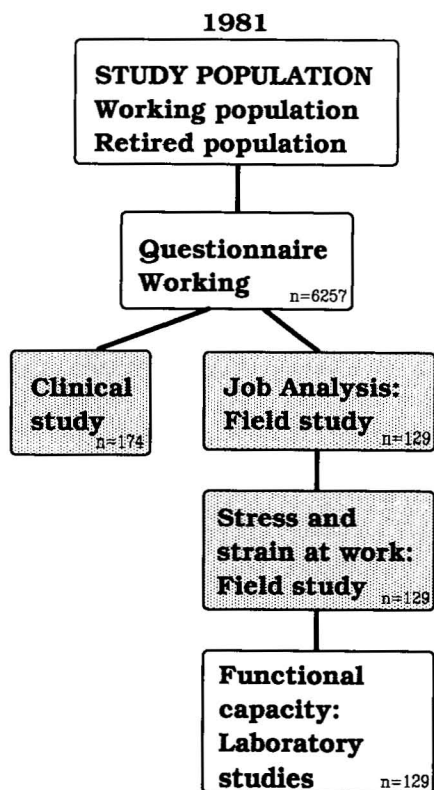


Figure 2. Content of the cross-sectional study in 1981. The studies in the shaded boxes were not repeated in 1985, whereas those in boxes without shading were repeated in 1985.

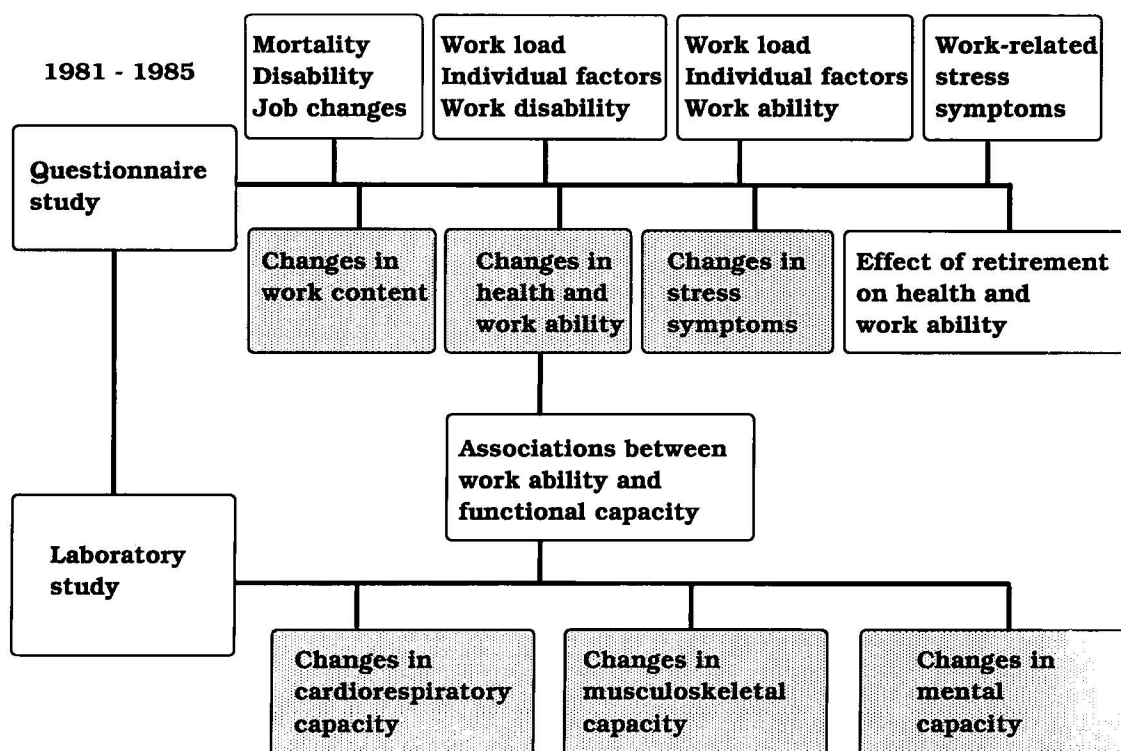


Figure 3. Content of the follow-up study from 1981 to 1985. Those studies in the shaded boxes report results of subjects who did not change occupation during the follow-up period.

The follow-up studies can be divided into two main parts, questionnaire surveys and laboratory investigations. The questionnaire surveys report the changes in work content and work demands (22), the employees' health and work ability (23), and the perceived strain for those who continued in the same job during the four-year follow-up period (24, 25). Other reports concern the reasons for dropout from worklife (26, 27) or the reasons for changing occupation (26). The laboratory studies were carried out to determine the changes found in cardiorespiratory (28), musculoskeletal (29), and mental capacity (30) among a sample of those subjects who continued in the same occupation during the follow-up period. The subjects of these investigations were randomly selected from those who responded to the questionnaire in 1981. The associations between survey and laboratory data was studied to determine how the experienced work ability and mean functional capacities were related (31).

Finally a model for determining the work ability of aging workers was also developed (32), and recommendations for improving and maintaining the health, work ability, and job satisfaction of aging workers were made on the basis of the findings of the project (33). One of the primary outcomes of the project has been the development of an action program on the health, work ability and well-being of the aging worker called "Respect for the Ageing" (33).

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