"Well-being and ability spell success"

WORK AMONG THE ELDERLY

Olavi Manninen

Work among the Elderly-The Thirteenth International ICCEF Conference on Combined Actions and Combined Effects of Environmental Factors, was held in Tampere, Finland, 11 - 14 September 2011. The conference was organized by Tampere Adult Education Centre (TAKK) together with the Work Life Ability Networks under the auspices of The International Society for Complex Environmental Studies (ISCES). This publication consists of a selection of reviewed and edited manuscripts involving the very presentations which were delivered at the conference.

PREFACE

A major challenge in modern work life is the command of the big picture. This is equally true of work among the elderly.

Work among the elderly and ageing people is very topical and important both nationally and internationally. This practice orientated book is of great social and scientific importance. The set of significant articles contained herein reveal the range of factors involved and the complexity of issue.

In the book the work and work communities are examined as a functional whole in a multidisciplinary framework from two perspectives; on the one hand, the preconditions for work and different work tasks are compared in different circumstances and work situations where the recipients of the care work, nursing and other such services are aged persons (the elderly), on the other hand, comparisons are made between and within the work communities of companies and work organizations of different branches and work units of different fields of activity where ageing (elderly) employees work with younger co-workers.

The book focuses on the work with the elderly, employees' control over their own work, the preconditions for the performance, quality and results of the work, the promotion and utilization of the worklife ability, rehabilitation and helping the ageing to continue working, further training and supplementary education, the management and functionality of working communities, innovations to facilitate the work, and equipment and structural solutions to promote safety and assist the elderly in their dwelling and living, multidisciplinary networking of the work with the elderly, and good practices and operational models.

Introduced newest findings and experiences are useful in promoting the management of work and ability and willingness to continue working, in improving the general preconditions of work and achievements and enhancing the overall quality, productivity and appeal of the work among the aged.

We believe that the book will contribute to reasonable grounds for the success at work among the elderly, one of the modern world's actual challenges.

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WORK AMONG THE ELDERLY

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SILENT DISCRIMINATION FACED BY OLDER PEOPLE NEEDS TO BE TACKLED

Sirpa Pietikäinen

European Parliament, European Union

We call them fossils, gramps and the elderly. We design more and more virtual and electronic services in order to reduce costs. We hear stories of elderly homes where diapers are not to be changed too often for cost saving reasons. Older people are often treated as objects, on behalf of whom others need to decide what is best for them. Seen as an economical burden, older people are often categorized in negative terms, something which does not provide a good basis for dignified ageing.

As long as nothing explicitly illegal happens, we tend to think that discrimination does not occur. But it does. Older people face silent and non-recognized discrimination in the form of non-access to services and non-inclusion into the activities of the rest of society. Thus, discrimination being invisible does not mean it does not exist. It means that discrimination is built-in and thus fundamental and as harmful as visible discrimination.

What measures do we have to tackle silent discrimination? Legal tools already exist to some extent, as the Charter of Fundamental Rights of the European Union became binding legislation with the Lisbon Treaty. However, this tool is applicable only in cases where EU-legislation is being implemented. A wide gap still remains to cover the prohibition of discrimination in all other areas in societies.

Discrimination must be prohibited horizontally, covering all areas of life in society and all vulnerable groups. European Union has initiated a horizontal anti-discrimination directive but it has not succeeded to finalise the process of legislation. Many countries worry about the costs that it would possibly put on public finances when requiring universal access to services and goods.

The adoption of the directive is the cornerstone of the EU-wide anti-discrimination legislation. But as long as the political debate keeps on going, we need to use other available tools and compare best practices between the Members States. For instance, France and Belgium have introduced legislation that prohibits the "abuse of weakness" of a person. Something of this kind is needed in the field of legislation to ensure that the rights of older people are also guaranteed in our societies.

In addition to improvements in legislation, better implementation and enforcement of the existing legislation are also needed. Silent discrimination needs to be made visible in our society. For this, we need a right-based approach towards older people. They are not always capable to defend their rights so society needs to guarantee them. Cases of discrimination need to be made visible as well as brought under judicial review and penalized.

In order to make non-discrimination of older people an even wider strategic issue of society, discrimination cases and the activities that aim at ending discrimination need to be reported on a regulatory basis. I suggested this kind of reporting mechanism in my

report "Women's role in an ageing society"[1] in September 2010. Institutions as well as the Member States of the European Union would need to report yearly to the relevant fundamental rights bodies on the cases of violation of older people's rights as well as on measures to be taken to abolish direct and hidden discrimination.

A discrimination-free society, however, is easiest to reach by changing the course of the very initial steps. Older people need to get more power when decisions affecting their lives are made. This applies, for instance, when urban planning is performed and service structures are created. Silent discrimination can be tackled by designing infrastructures and services where the needs of older people are taken into consideration from the very first step.

Extracts from Charter of Fundamental Rights of the European Union

Article 21

Non-discrimination
1. Any discrimination based on any ground such as sex, race, colour, ethnic or social origin, genetic features, language, religion or belief, political or any other opinion, membership of a national minority, property, birth, disability, age or sexual orientation shall be prohibited.

Article 25

The rights of the elderly
The Union recognises and respects the rights of the elderly to lead a life of dignity and independence and to participate in social and cultural life.

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[1]Adopted report of the European Parliament (7.10.2010), available in:
http://www.europarl.europa.eu/sides/getDoc.do?type=TA&reference=P7-TA-2010-0306&language=EN.

MEDICAL CARE AND THE WORKSITE IN NEAR FUTURE

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ABSTRACT

In the field of medicine, the post-genomic era will arrive. In the era of post-genomic medical care, gene therapy, regeneration care, and the development of new medicines based on genome studies will bring big changes and advances. In the 21st century, our society will develop into a knowledge based one. As a result, the aging work force will play a more important role. As computers and communication technology will develop, many people will stay and work at their homes. In our country today, the idea of occupational health is shifting from that of treatment for occupational diseases to health administration due to the improvement of working condition. As so-called home-offices will increase, we would have to assume a comprehensive approach, taking various living conditions into consideration. We will also be required to pay more attention to mental health problems. The development of genome medicine will require us to examine disease in terms of individuals, not the mass. Even if there are innovative changes in occupations and dramatic progress in medicine, the problems faced by any age should appear cyclically.

Key words: Prospects, Medical care, Worksite, Future

INTRODUCTION

This study focuses on medical care and the worksite in near future, mainly actual conditions in Japan. Then, the changing industrial medicine which depends on both medical care and worksite in future is predicted. The focus in the 21st century is on the knowledge of brain (Mainichi News Paper 2001). It will be aptly called a brain century. The control of aging will achieve its purpose to some degree. Robots supporting intellectual life will appear. Technology for breeding animals and plants with the same genes will be developed. It will become a New Robot Age, by the creation of robots, namely robots that clean, robots that perform operations, robots that provide care. The near future is characterized by the advance of science and technology. The establishment of recycling systems for used materials is predicted. We can use robots to do surgery and to take care of aged persons. Information-oriented society will be developed and characterized by an enormous volume and high speed of intellectual information. It is predicted that the market of wearable computers will amount to three trillions.

Internationalization will bring about the borderless world. Virtual nations which have new economic power based on information, technology and knowledge will be established. Development of scientific technology will form the educated society, and information oriented society will bring variety to people's sense of value. The decrease in the number of children and dramatic increase of high age population will bring changes to employment structure and disease construction.

NEW SOCIETY IN NEAR FUTURE

In near future, an intellectual society will appear. Knowledge plays a major role in producing riches (P F Drucker). The advance of technology enables people to work in their own homes (A Toffer). Sakaiya from Japan predicts the appearance of a wisdom society where the estimation of man's wisdom controls the new society. Expertise is the primary source for individual, while economic activities and productive materials, real estate, labor and capital are secondary factors for the economy. Only when one area of expertise is integrated with another in the process of researching subjects, it will become productive. Looking 10 or 20 years ahead is a realistic way of considering the near future. Although there may be various opinions on these perspectives, it is already a known fact that the labor population shifts to workers who engage in intellectual work and service work, and in the intellectual society it is presumed that intelligence will give rise to wealth, or alternatively, it is predicted that there will be an increase in various types of "borderlessness". New technology, currently being developed, and innovative changes in information technology, as well as globalization will lead to a new revolution in medical treatment.

PROSPECTS OF SOCIAL ENVIRONMENT IN NEAR FUTURE

Here we focus on the occupation and labor. Changes in the population structure will cause a rapid influx of high aged society. The high age rate of those older than 65 years will reach 25.5 % in year 2020 (Health and Welfare Statistics Association 2001). As for the change of disease pattern in high aged society, chronic diseases, such as malignant neoplasm and cerebro-vascular disease will increase. It was predicted that the medical treatment for cerebro-vascular disorders would develop by year 2010, but there was no success. Now it is predicted that it will be possible to control allergic diseases in year 2016, and to stop the advance of Alzheimer's disease by 2014, but it is now doubtful. Efforts must be concentrated on the appearance of new types of viral infection. There will also be changes in employment and family structure, namely an increase in the number of female workers, employees of high aged persons and an increase of high aged husbands and wives will occur. Due to the high degree of individual needs, it is predicted that the variety in one's sense of value will be accepted.

Figure 1 shows a 25.5 % percentage of the high age cohort of those older than 65 years in Japan. It is predicted that the aging population will increase to 32.44 million by year 2025 from 4.79 million in 1995. The rate of increase is over 6 times.

Dr. PF Drucker stated that the labor force has produced two revolutionary changes: an explosive increase in the number of people with higher education, and a rapid increase in the female population who work outside the home. With the aging population, the labor force shifts from one of blue collar workers to intellectual workers and service workers. The tertiary industry already has a share of 60 % of all industries, and the number of its workers is half of the total number of workers. It is presumed that the working style of workers in the tertiary industry will change in various ways. Factory work may come to resemble clerical work, and expertise may be required, experience may not be required, or work may be simplified.

The following changes in occupations are forecasted in near future.
1 The population of seniors 65 years of age or older will increase until 2020.
2 The tertiary industry will increase, and by 2020 two thirds of the entire population will be engaged in the tertiary industry.

3 There will be an increase in the wholesale and retail business, restaurants and the service industry (including special services, information services, surveying, advertising etc.)

4 Specialized and technical occupations (especially social welfare work, data processing, etc.) will increase by 16 % by 2020.
Service work, clerical work, and marketing will increase.

5 The number of workers engaged in skilled work, construction work, agriculture, fishery and forestry will decrease.

6 The number of female workers engaged in the tertiary industry will increase, and the number of male workers engaged in the tertiary industry will increase as well.

7 The ratio of aged people will increase further. There will be an increased number of aged people engaged in specialized and technical occupations and service work.

8 As for new graduates in 2020, 74 % will be engaged in the tertiary industry, and the ratio of those engaged in the secondary industry will decrease to 25 % (Japan Institute of Labour 1997).

Annual changes of employment between men and women are as follows. The share of primary industry in employment shows 6.4 % for male and 8.1 % for female employees in 1990. But in 2020, it will decrease to 2.3 % for male and 1.7 % for female employees. This degree of decrease means a remarkable advance in agriculture. The share of agriculture will decrease to 1.7 % in 2020 from 5.4 % in 1990 for male employees. On the other hand, the share of third industries in employment will increase by year 2020 from the level of year 1990, both for male and female employees. For example, the share increases to 23.2 % in 2020 from 4.3 % in 1990 for male service workers.
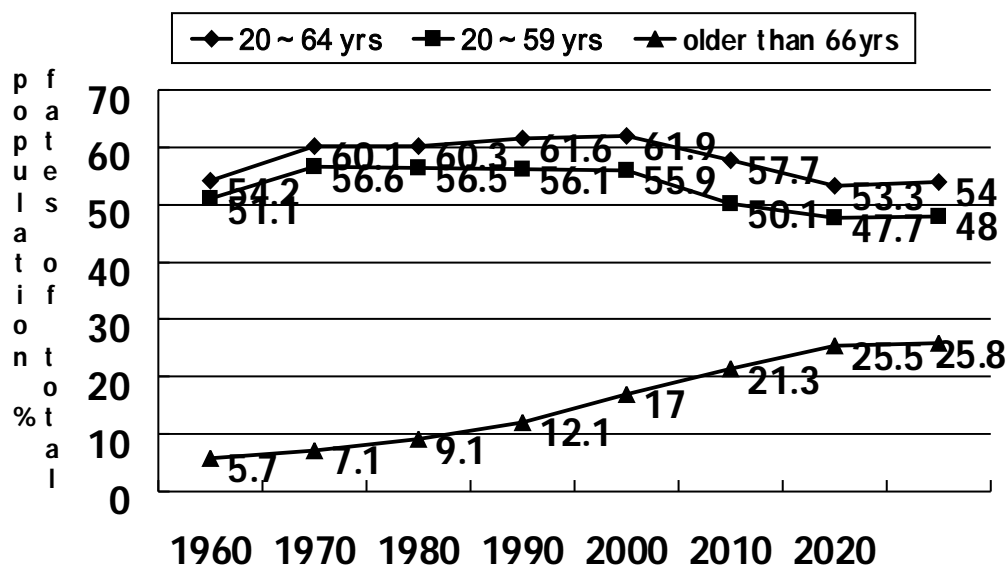
Figure 1. Prospective View of the Composition of Population by Age in Japan.

MEDICAL CARE IN NEAR FUTURE

The decoding of the structure of the genome was completed in year 2000. Therefore, the advance of medicine in the 21st century is expected to develop explosively. The 21st century has been designated as the post-genomic age (Imura 2001). One of the post-genomic fields of study is functional genomics. The presence of genes with unknown function is well-known. The second post-genomic field of study is comparative genomics. The application of numerous homologues to functional analysis of genes is effective. The analysis of the gene expression in post-genomic studies refers to

transcription research. The last post-genomic field of study is the structural genomics, which deals with the analysis of proteome conformation. It is expected that a new cell biology based on genome studies will develop. Brain research will achieve control of aging, and robots will support intellectual life. Regeneration medicine will also be established. As the last field of post-genomic medicine, we cannot forget the bioinformatics. The importance of this area will increase

The post-genomic medical care can be described as follows. The first type is the order-made medical care. It is called tailor-made medical care or individual medical care. This medical care will consider the differences among individuals. For example, the selection of treatment and prediction of prognosis will be based on the result of analysis of gene expression. The second is gene therapy, and the third is regeneration medical care. New medicines based on genome studies are expected. The medical care based on post-genomic studies must be established for immunological infection diseases. Molecular diagnosis will spread. It is an accurate diagnosis of disease. By the presymptomatic diagnosis, it will be possible to diagnose a disease before its development. Additionally, molecular diagnosis includes prenatal diagnosis, carrier and risk assessment.

ES cells have the capacity to grow into an organ or tissue of the human body. Tissue made of ES cells that were cultivated in a test tube is transplanted to treat organs damaged by injury or disease. ES cells separated from externally fertilized eggs are provided by a couple that have been treated or infertility cultivated. This is a new supplementary medical care supporting the current treatment by medication and operations.

In near future, focus will be on individual variation in health disturbances (Okada 1997, 1998). Here the risk management for accurate assessment of individual variation in susceptibility determined by genetic polymorphism is important. The science will be faced with ethical, legal and social issues. The age of translational medicine will arrive, and evidence-based medicine will shift to discovery-based medicine. Medicine in near future is characterized by borderlessnes. Pediatrics and obstetrics will shift to child and maternal medicine. Surgery will be supposed to focus on less-invasive treatment without border to internal medicine. The background of cultural anthropology should be considered in neuro-psychiatrics. Public health will shift to policy issues for medicine and medical economics. Preventative nutrition science and space medicine will appear.

OCCUPATION AND OCCUPATIONAL HEALTH IN NEAR FUTURE
A perspective on the occupation, especially the combination of medical care and occupation, will finally be introduced into occupational medicine. In near future, even blue collar workers who use machines in the factory have to follow directions programmed by computers. Meanwhile, intellectual workers need machines such as computers, ultrasonic analyzers, etc. No one can be productive without the knowledge of the use of machines. The new market is not a market of traditional production property such as machinery and plant facilities, or consumable goods. The leading growth markets are information and communication, and environmental markets such as air purification and water quality improvement, as well as the development of infrastructures, including the remodeling, expansion and renewal of roads, airport, etc.

The theme we area dealing with here concern industrial health shift from occupational disease to health administration. The problem of industrial health in near future is as follows. The main focus in environmental improvement will be on the influence of a long-

term exposure to extremely small amount of substance. The living conditions outside of the working place must also be considered. A broader and deeper connection and collaboration with foreign labors in Japan and overseas and more counterparts to small or middle factories are needed. Recently the microwave, automation technology and computer oriented industries have been in the center of attention. Here mental health is an important problem. A micro dose of microwave or electromagnetic wave over a long period of exposure will affect workers' health in the advanced industries, causing illness such as occupational cancer. Bioethics concerned with life and living substance is now a major issue. Accordingly, changes in the labor system, such as flextime, whereby workers can select their working hours within a certain time span, have been implemented. With remarkable changes in social structure, it is predicted that an intellectual society will develop, and the larger segment of the labor force will be that of intellectual workers.

Accordingly, medical treatment for industrial disease will be the most critical issue. In order to deal with problems associated with various types of intellectual work, including work using the eyes and upper body, not only should workers' physical strength be enhanced, but also the discipline of mental health should be expanded and deepened. The advancement of female workers will necessitate an industrial medical approach to female labor. The information work is the main work of intellectual workers. Because information work is also visual work, there are problems with visual disturbances, musculoskeletal disorders, disorders of lumbar, cervical and shoulder area, and mental or psychic disturbances.

The rapid progress of technical innovation makes it necessary to respond to individuals rather than groups, due to diversified problems. In solving problems, not only life factors but also individual factors should be taken into account. Diversified needs resulting from a diversification of values will require a variety of solutions. Population approach will shift to high risk approach. Group correspondence will shift to individual correspondence. A genome is the set of genetic information that is necessary for a living creature. It may be possible to protect our bodies from a certain disease by identifying the high-risk group of genes and taking countermeasures against environmental factors. In other words, it is not altogether a dream to establish predictive, protective and industrial medicines by means of genome analysis. The development of genetic engineering has made possible the identification of all of the properties of a carcinogenic gene. It is anticipated that it will become possible to reinforce genes to resist cancers, to protect genes that control aging from changing, and to forecast life span by analyzing individual genes.

CONCLUSION

It may be possible to identify an individual health condition according to a clinical category, and it may be possible to identify which of two living areas is healthier for a group. However, if it is not possible to forecast the future health condition, the information obtained is only relevant for a certain point of life, and is not sufficient for the diagnosis of the health condition. It is therefore necessary to develop a discipline that will enable us to forecast health conditions, and this information will promote concrete knowledge of health conditions.

The field of industrial medicine includes mental health and health administration as subjects to be studied. However, in the light of the history of industrial medicine, it is unlikely to undergo a fundamental change, and although the points to be taken into

account may differ from what they were up until now, it will continue much the same as it has been in the past.

"Rinne" is Buddha's famous word. It means that everything will develop and repeat, all events will occur cyclically. It was expressed about the medicine and the occupation of the near future. Just like the word Rinne, even if there are innovative changes in occupations and dramatic progress in medicine, the problems faced by any age should appear cyclically.

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WILLINGNESS AND ABILITY TO KEEP ON WORKING: CARE WORK AND CARE WORKING COMMUNITIES COMPARED WITH 10,000 OTHER TASKS AND WORKING COMMUNITIES

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ABSTRACT

The presentation is a compilation of statistical analyses and results from several consecutive studies. Its general task is to provide detailed information on how factors related to the performance of work, the working culture at the workplace, and the life situation increase or decrease the willingness and ability of employees to cope and to keep on working. The information is analysed by sectors (groups of organizations, branches), work organizations, work tasks and work units in the elderly home under study as well as home care. Practical care and nursing for the elderly is compared to children's care and kindergarten teaching, care for people with musculoskeletal disabilities, care for the intellectually and developmentally disabled, and other jobs, such as administration and office services, residential care and construction services, sanitation, cleaning and maintenance services, early education and teaching, catering and food services. The persons working in elderly care are employed by four municipalities in the Tampere region (elderly homes 1-4) and home care services.

The results reveal that to keep on working an employee must have both the willingness and the ability to continue. Willingness or ability alone are not enough. A functional working culture provides the basis that promotes both the willingness and the ability to keep on working. Satisfaction with one's own life, that is, good management of one's own life increases the willingness and ability to continue working even in work communities with a poor working culture. Coping with the work and continuing to work are the outcome of the simultaneous combined effects of factors related to work, the working community, and life outside the workplace (leisure). Compared to other persons, supervisors, managers and young male workers are more often unwilling to keep working even though they rated themselves to be fit to continue. Regarding the availability of the workforce, it is particularly worrying that unwillingness to keep on working is most prevalent among the young and those having worked the shortest time in their present job and with the shortest work history. The majority of men (93.3 %) and women (84.6 %) under 26 years of age involved in poor working cultures are unwilling to continue working until the age of 63 or beyond.

The estimates of the respondents of the length of their working career and duration of employment vary greatly. There is no common view on the length of people's working careers and duration of employment. Of the people employed in different industries, 20.4 to 51.1 % estimated that they could keep on working full-time in their present employment until the age of 60 or longer. A few percent of all employees expected to continue working even after 65 years of age. Among those planning premature retirement or moving to a different job, three fourths of those employed in health care and the medical industry, and over a half of those employed in children's care, expected to continue working full time until the age of 55 to 59 years.

Like the other employee groups, a majority of both those working with children and those working with the elderly were unwilling to continue working until the age of 63 in a poor working culture. By contrast, a majority of the employees were willing to keep working until 63 or longer if the workplaces had been designed, and the personnel dimensioned, correctly. In comparison to the reference work organizations (i.e. metal workshops, mail delivery services, administration computing services, material services and aeronautical engineering, care for the physically disabled, care for the intellectually and developmentally disabled, children's care in kindergartens, home care, working in a municipal organization), the human resources of the workplaces for the care of the elderly were lower. 77.9 to 85.2 % of people working with the elderly consider the dimensioning of human resources at their workplace incorrect. Incorrect dimensioning of staff increases the workload experienced by the workers. With increased workload, both the unwillingness and inability of employees to keep on working increased. A poor working culture at the workplace and an excessive workload reinforce each other in a negative way. A poor or bad working culture and high workload make people feel indisposed and find the continuation of work unpleasant. They are not willing to commit themselves to the work. A dysfunctional working culture, an excessive workload and inadequate means to control one's own work, combined with the indisposition of the employees and their unwillingness to keep on working, constitute a serious problem and threat with a view to both the availability and appropriate use of labour.

The situation calls for fast and effective development of work life. Education must be reformed. The main subject of reformed education should be work life ability. Hectic changes and globalization of work life requires education to be provided in a proactive, practical, multidisciplinary school of work life ability that offers guidance and supports a holistic approach to development. The rapid change of work life is reflected in educational institutions as a particular need to reform the management of learning and to encourage teachers to update their knowledge of work life to meet the present requirements. A central reason to implement such a reform is the research result that in-house training helps improve the well-being and coping with the work among elderly workers significantly and that the positive changes in the well-being experienced by the workers and their coping with the work are particularly evident in so-called ordinary (normal) companies and among those in poor physical condition and with multiple symptoms.

Key words: Length of employment, Continuing to work, Work life ability, Work culture, Working community, Work ergonomics, Management of life, Education, Training at workplace, Elderly care

BACKGROUND AND STARTING POINTS

A major challenge of worklife is command of the big picture. Above all, we need to grasp and manage a functional whole consisting of three areas: work, life and know-how, know-how being the foundation of all development: good work and good life require adequate know-how.

These areas are interconnected and constitute the multidisciplinary field of worklife ability. Worklife ability is a key factor in the success of enterprises and work organizations in a constantly globalising economy. The promotion of worklife ability creates well-being. The level of worklife ability reflects the quality of the work environment.

In this context it should be borne in mind that work ability can be maintained by means of ergonomics and medicine, but only partly, if know-how is not maintained at the workplace, the workforce is misused, interaction in the working community is insufficient or management is problematic. Frankly, correct dimensioning of staff indicates that the work activity is based on proper planning and the right persons occupy the right place at the right time. The dimensioning of staff is an indicator of the quality of management.

High willingness and ability to keep on working are the ultimate aim. The identification of needs related to both well-being and know-how and provision of constant inspiration for staff are the major tools for achieving it.

The maintenance of work ability and continued work require a holistic analysis. A life-span perspective is needed. The theme is urgent due to the prevailing ageing structure of the population, issues concerning the availability and retention of labour as well as the usage and dimensioning of staff at workplaces.

The general aim of this presentation is to provide detailed information on how factors related to the performance of work, the working culture at the workplace and the life situation increase or decrease the willingness and ability of employees to cope and to keep on working.

MODES AND LEVELS USED IN THE REVIEW

The presentation is a compilation of statistical analyses and results from several consecutive studies having been conducted under the direction of myself.[1, 2, 3]

The gathered information is analysed by
> sectors (groups of organizations, branches),
> work organizations,
> work tasks and occupational titles,
> work units in the elderly home under study and in home care.

Practical care and nursing for the elderly is compared, among other things, to
> children's care and kindergarten teaching,
> care for people with musculoskeletal disabilities,
> care for the intellectually and developmentally disabled,
> administration and office services,
> residential care and construction services, sanitation, cleaning and maintenance services,
> early education,
> teaching,
> catering and food services.

Furthermore practical care and nursing for the elderly is compared to
> metal and engineering industry,
> food industry,
> pulp and paper industry,
> trade and restaurant services,
> state and municipal administration,
> information technology,
> mail services.

The overview on the preconditions for continuing to work is complemented by data gathered from thousands of mature employees and teachers of professional subjects. The people who participated in the researches were employed in enterprises and organizations representing such fields as

>textile and clothing industry,
>shoe, leather and rubber industry ,
>building construction industry,
>building services industry,
>traffic,
>expert services,
>teaching (vocational colleges, university of applied sciences),

TARGET ORGANIZATIONS AND SUBJECTS
The studies were participated by several dozens of enterprises and work organizations from the metal and engineering industry, food industry, construction industry, shoe, textile and clothing industry, pulp and paper industry, trade, financial services and restaurant services, state and municipal administration, education, social and care services, information technology and mail services. Overall, the results describe the views of more than 10,000 Finnish workers, managers and executives of their own work, working community and continuation of their work. The persons working for the care for the elderly are employed by four municipalities in the Tampere region (Elderly homes 1 to 4) and in home care services.

LENGTH OF EMPLOYMENT
The estimated length of employment is described in three ways. The lower limit is set to 60 years, to 63 years and to 65 years. Using these ages as criteria the subjects estimated their prospects of continuing to work in full-time employment.

Figure 1 demonstrates that out of the people employed in different industries, less than 50.0 % estimated that they could keep on working full-time in their present employment until the age of 60 or longer. One fifth of those employed in the food industry and 40.0 % of those employed in nursing and care services estimated that they would be able to keep working until that age.

In this study the target limit for continuing to work is set to 65 years or beyond. The percentage distributions of Figure 2 show that the numbers of those who continue working and are able to cope with the work decrease considerably.

Raising the lower limit of retirement by five years from 60 years to 65 years decreases the share of those that keep on working by 30.0 to 40.0 % percentage points. A few percent of all employees expected to continue working even after 65 years of age. Every tenth of those employed in trade and restaurant services estimated that they would be able to continue working until that age. In other sectors the shares of those who expected themselves to be able to continue until that age were considerably smaller. In the care sector only 3 to 6 percent of those working with the elderly or children assessed themselves to be able to continue working so long.

Figure 1. Length of employment. Continuing to work until the age of 60 years or longer by industrial sectors (all respondents, n=1215).
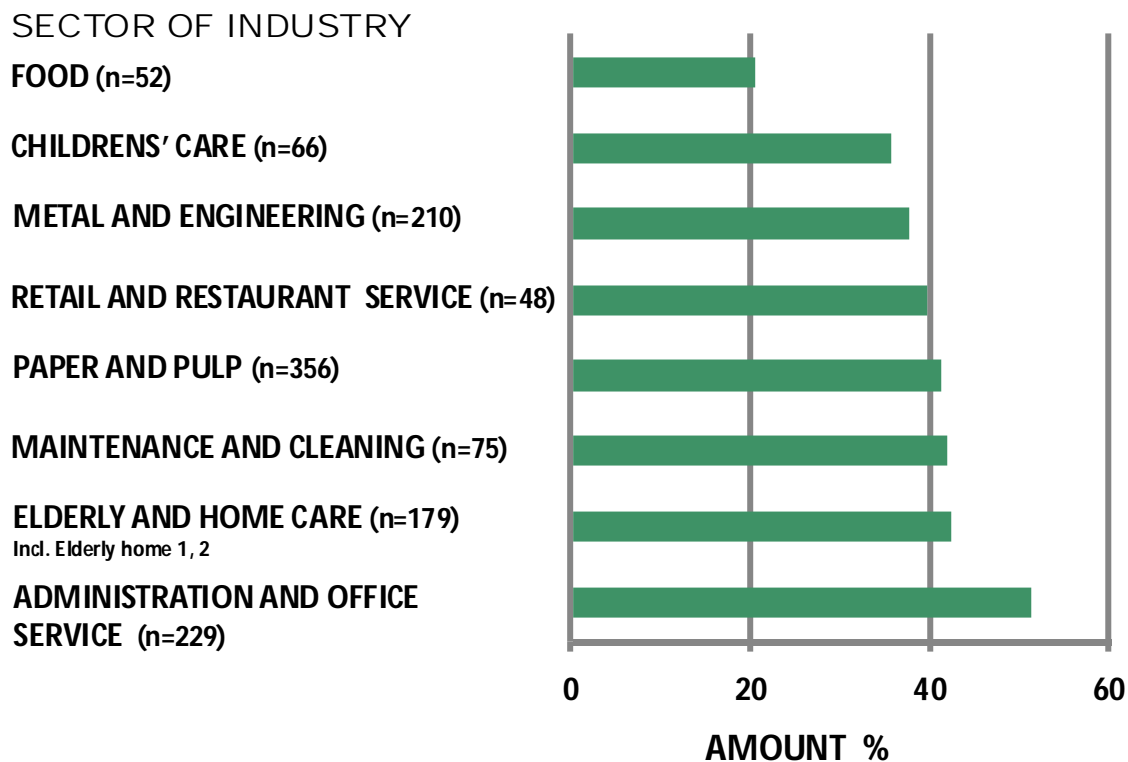
SECTOR OF INDUSTRY

FOOD (n=52)

CHILDRENS' CARE (n=66)

METAL AND ENGINEERING (n=210)

RETAIL AND RESTAURANT SERVICE (n=48)

PAPER AND PULP (n=356)

MAINTENANCE AND CLEANING (n=75)

ELDERLY AND HOME CARE (n=179)
Incl. Elderly home 1, 2

ADMINISTRATION AND OFFICE SERVICE (n=229)

AMOUNT %

Among those planning premature retirement or moving to a different job, three fourths of those employed in health care and medical industry and over a half of those employed in children's care expected to continue working full-time until the age of 55 to 59 years.

In the following the target age limit for the length of the working career is set to 63 years. People at workplaces were asked to assess their willingness and ability to keep on working until the age of 63 years. This bar chart describes the willingness and ability of employees performing different work tasks to continue working until the above-mentioned age, which is used as a criterion. The green bars indicate the willingness and the blue ones indicate the ability to keep on working until the target age.

Figure 2. Length of employment. Continuing to work until the age of 65 years or longer by industrial sectors (all respondents n=1215).

SECTOR OF INDUSTRY

CHILDRENS' CARE (n=66)

FOOD (n=52)

MAINTENANCE AND CLEANING (n=75)

ELDERLY AND HOME CARE (n=179)
Incl. Elderly home 1, 2

ADMINISTRATION AND OFFICE SERVICE (n=229)

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METAL AND ENGINEERING (n=210)

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AMOUNT %
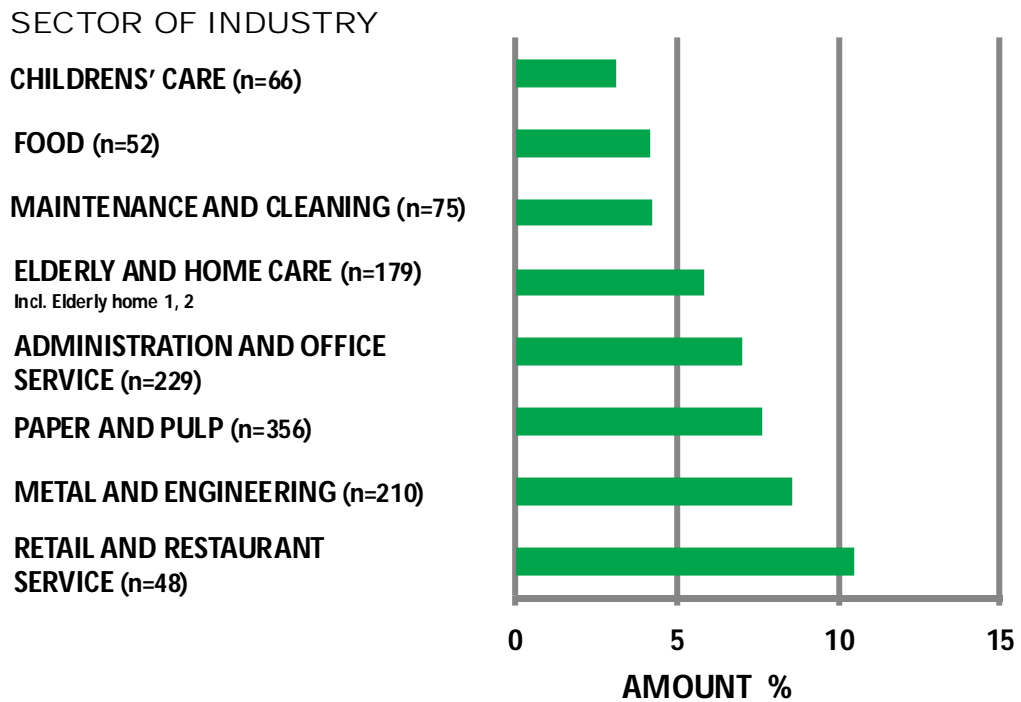
Figure 3. Length of employment. Willingness and ability to continue working until the age of 63 years or longer by work task categories (n=1201).

TYPE OF WORK TASK

ADMINISTRATION, SUPERIOR AND OFFICE SERVICE (n=149)

CATERING AND FOOD SERVICE (n=57)

TEACHING (n=247)

EARLY EDUCATION (n=298)

CARE AND NURSING (n=272)

MAINTANCE, SANITATION AND CLEANING (n=178)

WILLING TO KEEP WORKING

ABLE TO KEEP WORKING

AMOUNT %
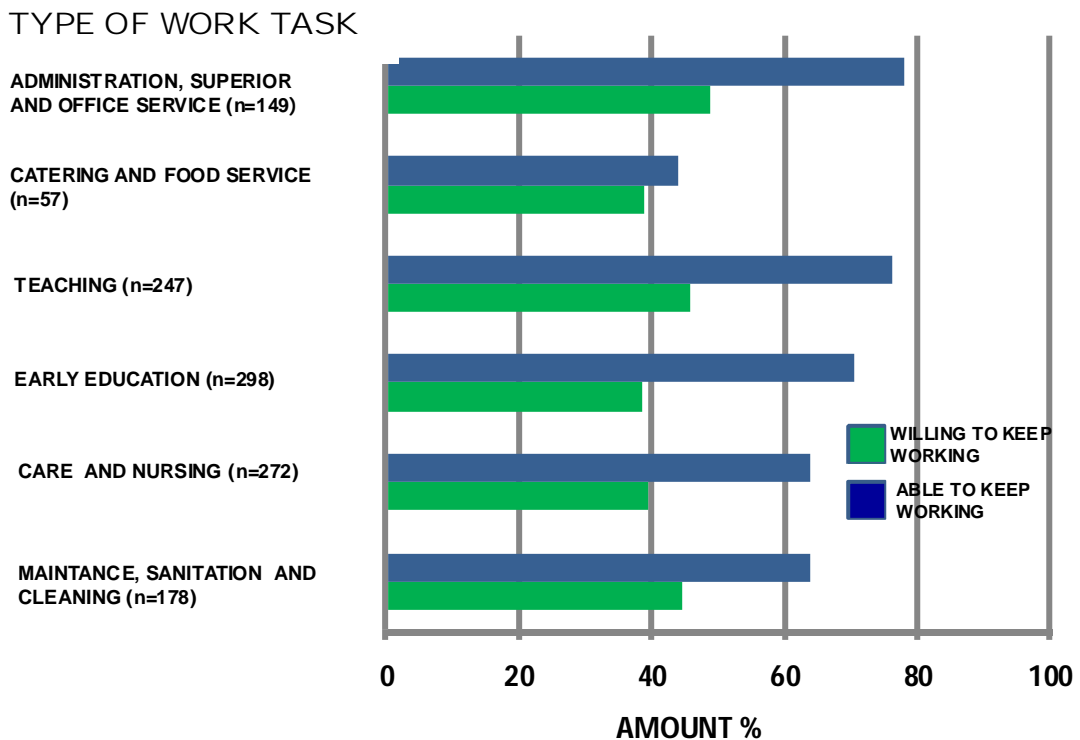
As Figure 3 reveals that less than half of all employees are willing to continue working until this target age (green bars). The smallest share of the willing are found for those employed in various jobs in early education, restaurant services and the care sector. Those employed in restaurant services also assess themselves able to keep on working less often than other employees (blue bars).

CONTINUING TO WORK IN WORK UNITS (WARDS) OF ELDERLY HOMES AND HOME SERVICES

The bars of Figure 4 describe the willingness to continue working among those employed in various positions at eight different work units (wards) of an elderly home. This is municipal Elderly home 4. The green bars show the percentages of those with a positive attitude towards continuing to work. The red bars, respectively, depict the percentages of those with a negative attitude.

Figure 4. Willingness to continue working until the age of 63 years or longer in work units of municipal elderly home (Elderly home 4, n=411).

The shares of those with a negative attitude towards continuing to work until the age of 63 years among those employed in different positions at the work units (wards) varied from 52.6 % to 69.0 %. It should also be noted here that 23.0 % to 55.0 % of the employees assessed themselves not fit enough to keep on working until the age of 63 years or longer.

Correspondingly, the shares of those with a negative attitude towards continuing to work until the age of 63 years among those employed at five different work units of home care services varied from 54.0 % to 63.0 % (Figure 5). Every second of those employed in night duty were willing to keep on working. It should also be noted here that 21.0 % to

50.0 % of the employees assessed themselves not fit enough to keep on working until the age of 63 years or longer. The home care service organization is a municipal organization, too.

Figure 5. Willingness to continue working until the age of 63 years or longer in work units of municipal home care (n=292).
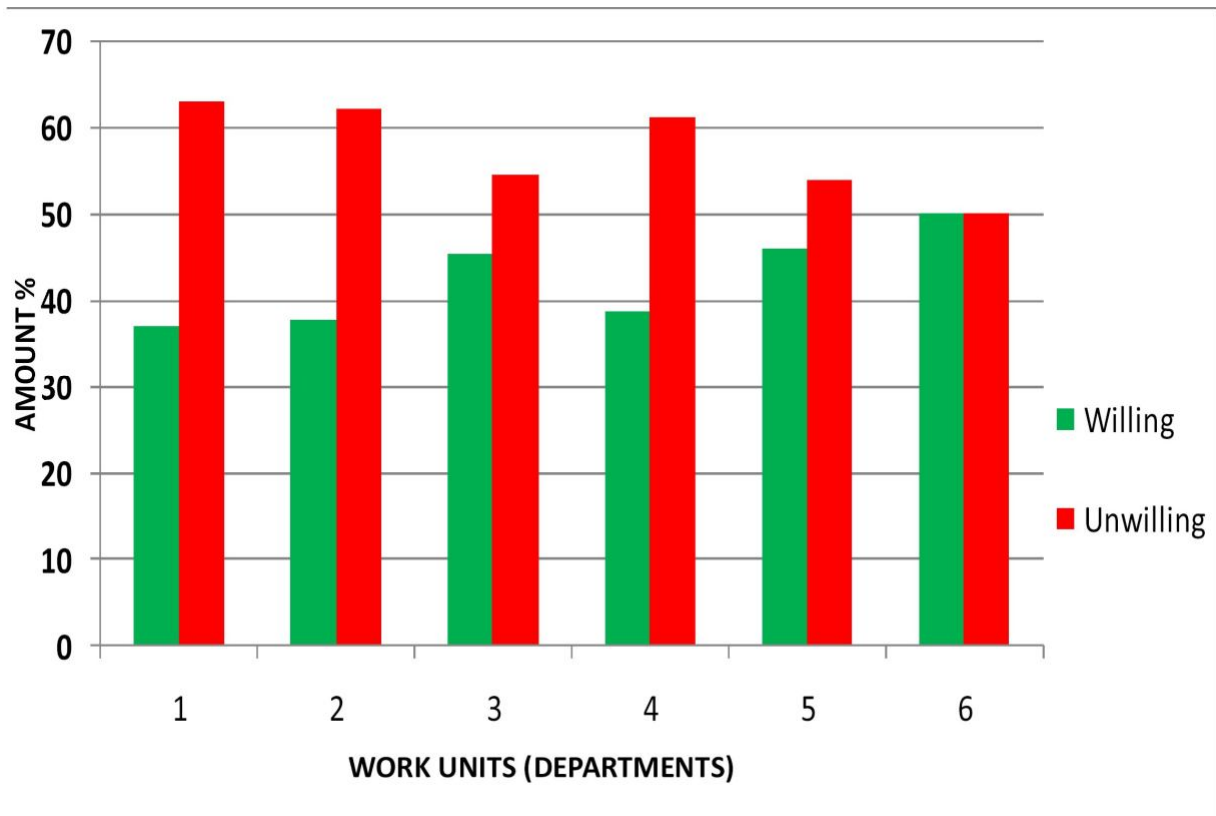
HUMAN RESOURCES OF THE WORKPLACES

Skilful management of human resources is nowadays a major challenge. Correct dimensioning of personnel and tasks and good organization of work tasks are of crucial importance in promoting people's willingness and ability to keep working and in maintaining the high quality of work. The dimensioning of staff is one of the characteristic indicators of the working culture in a working community. Human resources affect both the quality of work and the image of the organization.

In comparison to the reference work organizations (i.e. metal workshops, mail delivery services, administration computing services, material services and aeronautical engineering, care for the physically disabled, care for the intellectually and developmentally disabled, children's care in kindergartens, home care, working in a municipal organization) the human resources of the workplaces for the care for the elderly were lowest (Figure 6). 77.9 to 85.2 % of people working with the elderly consider the dimensioning of human resources at their workplace incorrect. These figures apply to two municipal elderly homes (Elderly home 3 and Elderly home 4).

Figure 6. Amounts of those who consider the dimensioning of human resources at their workplace are incorrect in different work organizations (all respondents, n=3488).

WORK ORGANIZATION

Work Organization	Amount %
HOME CARE (n=347)	53,8
ELDERLY HOME 4 (n= 411)	85,2
CHILDREN'S CARE (n=98)	34,7
ELDERLY HOME 3 (n= 169)	77,9
ADMINISTRATION COMPUTING (n=78)	74,4
MUNICIPAL ORGANIZATION (n=951)	45,5
CARE FOR THE INTELLECTUALLY AND DEVELOPMENTALLY DISABLED (n=482)	61,2
MATERIAL AND AERONAUTICAL ENGINEERING (n=441)	54,1
MAIL DELIVERY (n=216)	59,3
CARE FOR THE PHYSICALLY DISABLED (n=93)	45,2
METAL WORKSHOPS (n=272)	41,5

AMOUNT %

As the figure shows, the dimensioning of human resources is found incorrect in administration computing, too. The explanation can probably be found in the productivity programme that has been used for years in the government, which has lead to personnel reductions at workplaces. New employees have generally not been recruited to replace the ones who have left.

The figure also shows that the dimensioning of personnel has been most successful in municipal child care and various offices of a company representing the metal industry located in five to six different places around Finland.

CONTINUING TO WORK BY HUMAN RESOURCES AT ENTERPRISE LEVEL

Incorrect or neglected design and dimensioning of personnel leads to increased workload and uneven distribution of work between employees, increased time pressure and haste, and make it increasingly difficult to finish tasks properly.

Incorrect dimensioning of human resources also leads to a constantly deteriorating trend, which is difficult to control or stop. The phenomenon is known as a vicious circle and it feeds itself once it has started.

In Figure 7, willingness is depicted separately for those employees who regard the human resources of their workplace poorly dimensioned (red bars in the figure) and for those who find the human resources well dimensioned (blue bars).

Figure 7. Willingness to continue working until the age of 63 years or longer based on the correct or incorrect dimensioning of human resources in the work organization (n=3488).
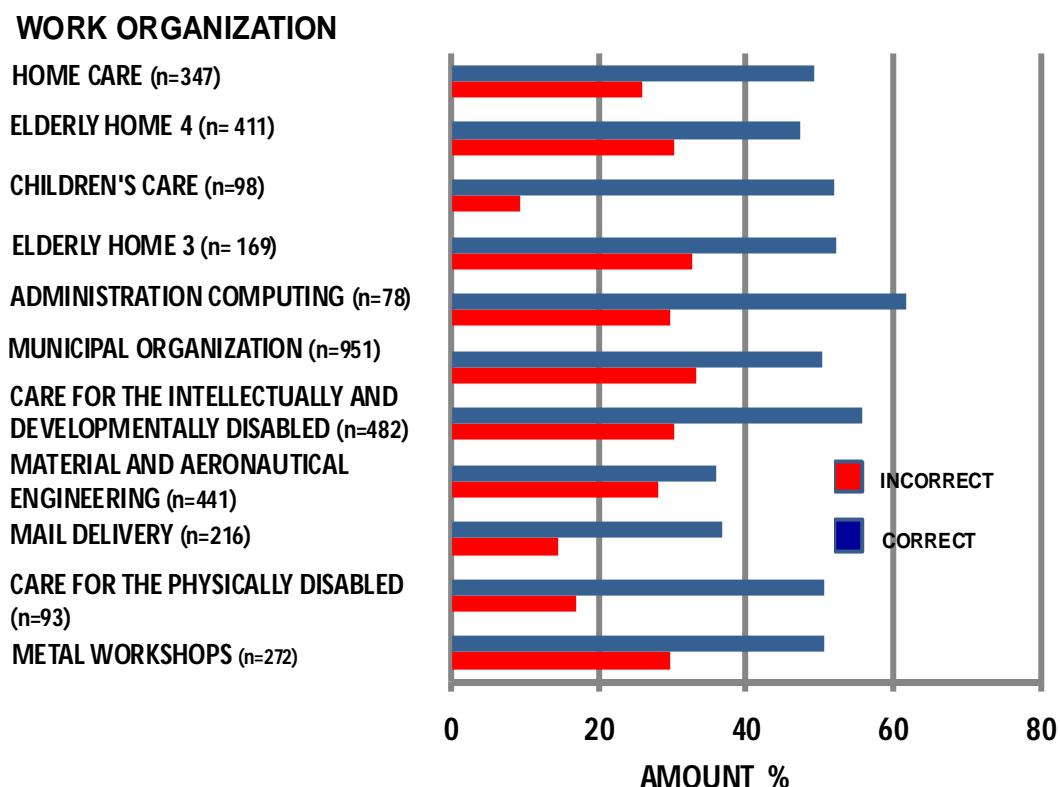
The red bars in the figure reveal that less than every third employee in all enterprises are willing to continue working if human resources have been dimensioned incorrectly. In those enterprises where the human resources have been dimensioned correctly, the shares of those willing to continue are 20 to 40 percent higher. Willingness to continue working is lowest at work organizations of child care and care for invalids with poorly dimensioned human resources.

HUMAN RESOURCES INDEX

The adequacy of human resources was assessed by calculating a human resources index.

The index was built by summing the scores of three factors. They indicate the number of personnel and time- and task-based need of personnel at the workplace. The human resources index was divided into three categories by tertiles (thirds) of the distribution of the sums of scores ("poor" or "bad"=0.00-33.3 %, "average"=33.4-66.6 %, "well" or "good"=66.7-100.0 %).

Figure 8 demonstrates that incorrect dimensioning of staff increases the workload experienced by the workers in an elderly home. The need to lighten the workload is reported six times more often when human resources are dimensioned incorrectly compared to the case where they are dimensioned well and correctly.

Figure 8. Shares of those employees of an elderly home (Elderly home 4) who consider the reduction of their physical workload the most important way to promote their coping with the work based on the adequacy of human resources at the workplace (n=411). Human resources are described by the three categories of the human resources index.
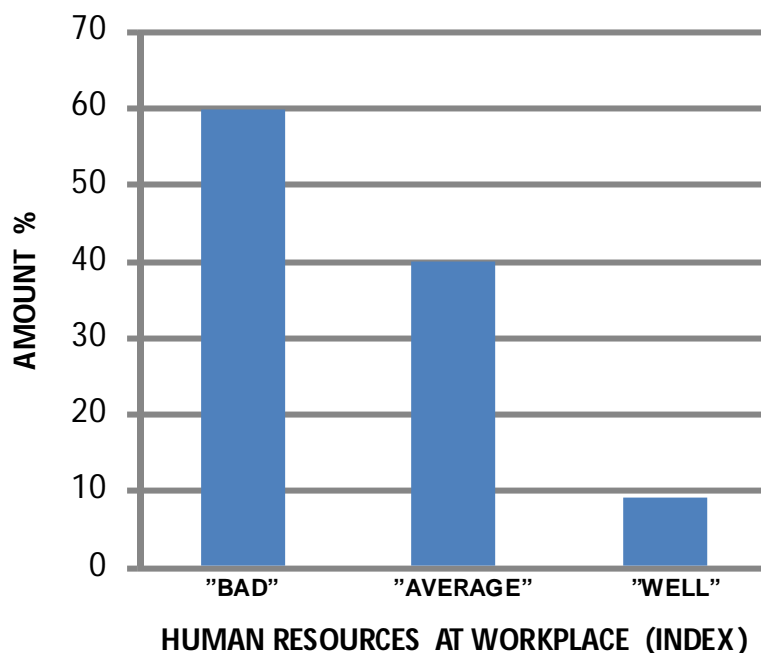
Compared to work in other work organizations, the work done in elderly homes or with the elderly in general is more physically straining. Cooks, housekeepers and employees in catering services also find their jobs physically straining while those working in kindergartens and day-care centres experienced their job as mentally straining.

The two-part Figure 9 reveals that both the willingness and the ability of the employees in an elderly home increases considerably when the personnel resourcing of the workplace is done correctly.

With "good" personnel resourcing, over 80.0 % consider themselves fit to continue working (blue bar in the right figure). In the opposite case, when the personnel resourcing of the workplace is incorrect, both the willingness and the ability of the employees to continue working decreases considerably. The left figure (red bar) indicates that 71.0 % of the employees do not want to continue working at a workplace with a "bad" personnel resourcing.

WORKING CULTURE INDEX

The key element in working communities is the real situation between people. The experienced state of the working community is called the working culture. Shortly saying, the prevailing working culture either pushes employees to quit their jobs or promotes their commitment to work. The working culture also reflects the level of the worklife ability in the work organization.

Figure 9. Willingness and ability to continue working until the age of 63 years or longer in a municipal elderly home (Elderly home 4) based on the adequacy of human resources at the workplace (n=411). Human resources are described by the three categories of the human resources index.
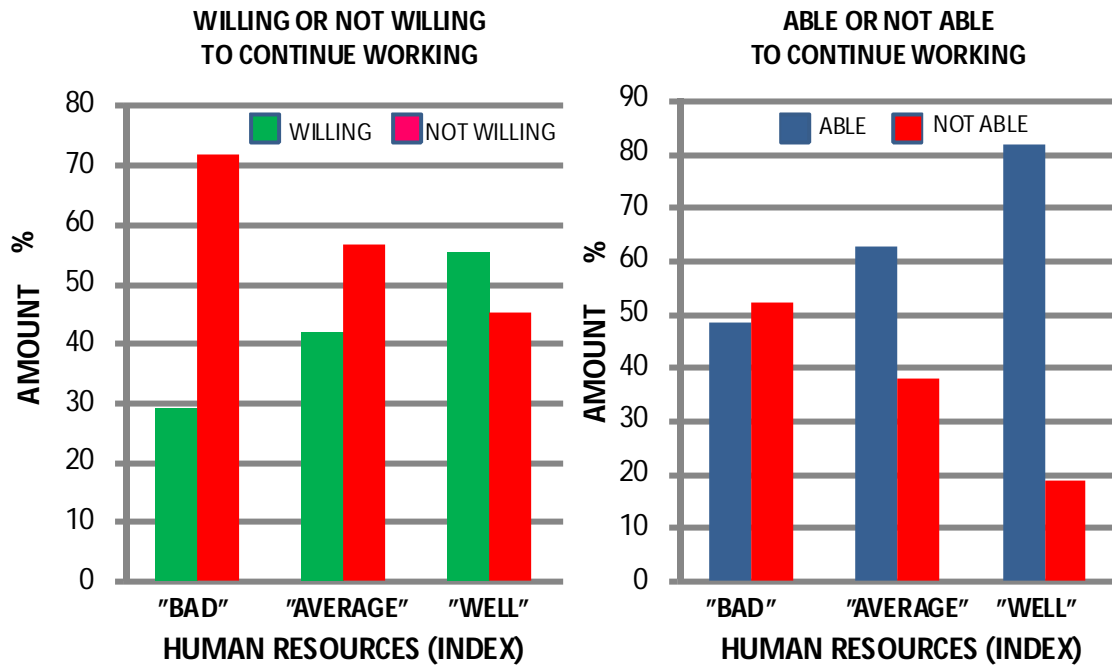
The working culture at the workplace consists of many mutually related factors such as the functioning of the organization, communication in the organization, mutual interaction of personnel, social working conditions and confidence. The working culture at a working community was assessed by a total of 61 different characteristics. The scores of the characteristics were used to calculate a sum variable, the so-called working culture index.

CONTINUING TO WORK, WORKLOAD AND WORKING CULTURE
A functional working culture is not enough if own workload is experienced as too high. A poor working culture at the workplace and excessive workload reinforce each other in a negative way. A poor or "bad" working culture and high workload make people feel indisposed and find the continuation of work unpleasant. They are not willing to commit themselves to the work.

Figure 10 shows that a majority (85.2 %) of those employed in an elderly home (Elderly home 4) who assessed both their own work as physically loading and the working culture of their working community as "bad" were unwilling to continue working. Among the employees, unwillingness was six times more common than willingness to continue working.

Figure 10. Willingness to continue working until 63 years or longer among those employees of a municipal elderly home (Elderly home 4) who consider the reduction of their physical workload as the most important way to promote their coping based on the working culture at the working community.
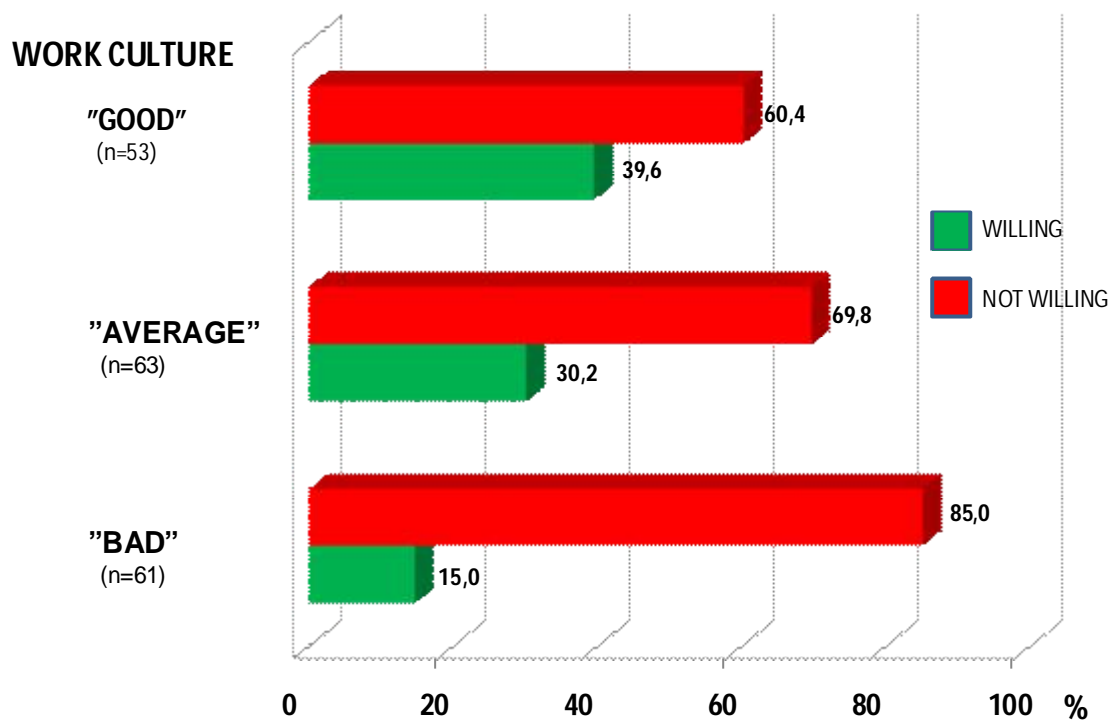
LENGTH OF EMPLOYMENT, AGE AND WORKING CULTURE

An analysis by occupational titles shows that two thirds (74.2 to 80.0 %) of the young practical nurses employed in an elderly home (Elderly home 4), caretakers and janitors (83.3 %), nurses and rehabilitation personnel (76.0 %) were unwilling to continue working until 63 years of age. At least every third of the young employees working in an elderly home (33.0 to 45.8 %) considered themselves not fit enough to continue working until the target age.

Figure 11 crystallizes the attitudes of people of different ages employed in the care sector towards continuing to work.

The vertical axis shows the percentages of those willing to continue. The horizontal axis represents the age cohorts. It can be observed that only every fifth of the respondents younger than 35 years employed in the care sector were willing to continue working until the target age (as indicated by the left green bar of the chart). More than one half of these young people consider themselves not fit enough to keep on working until the age of 63 years.

Regarding the availability of workforce, it is particularly worrying that the unwillingness to keep on working is most prevalent among the young and those having worked the shortest time in their present job and with the shortest work history.

Figure 11. Willingness and ability of nursing staff to continue working until the age of 63 years or longer in the municipal organisation by age groups (n=272).
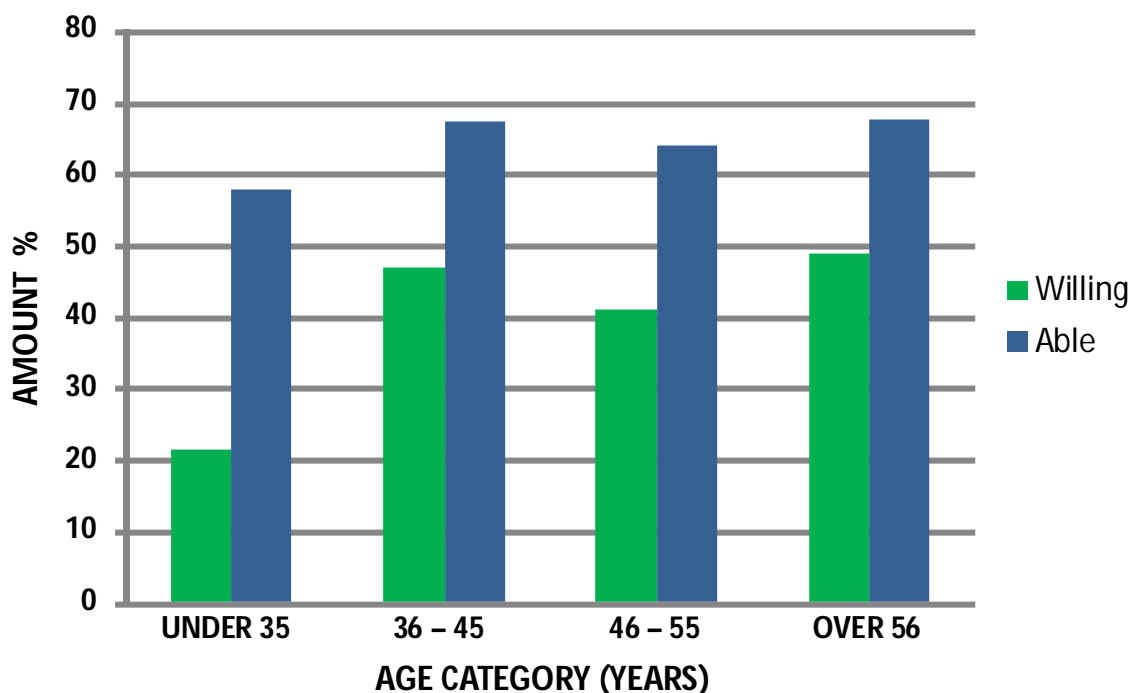
CONTINUING TO WORK AND JOB ORIENTATION

Job orientation is a key feature that characterizes the working culture and affects the entire working community in many ways. Properly realized job orientation enables people to succeed in their work. In its ideal form job orientation is a continuous process. It includes correct and up-to-date information on the work organization and the enterprise. The recruitment of new personnel is known to be a costly investment, which can be wasted if the new recruit is not initiated to the work and the conventions of the workplace.

Job orientation is also related to people's willingness to continue working. The orientation is particularly important when young persons are starting their career. The willingness to keep working is also affected by the way the newcomer is welcomed and treated at the workplace. The experiences of the first days will often be remembered.

Despite the importance of the issue, a majority of the members of the target group reports that the job orientation in their own workplace is inadequate or neglected altogether. About one half of those employed in home care and the largest elderly home think that a new recruit does not get adequate information on the goals and conventions of the organization at the orientation stage. Both the method of orientation and the time used for it vary between work units. The respondents report embarrassing situations that have arisen when nobody in the working community has been willing to orientate the newcomer or take him or her as a working partner.

Not surprisingly, due to the lack of orientation, new employees are not committed to the work because they do not know what to do, what they are expected to do, and what are the common rules of the workplace. The results are soon visible in high personnel turnover and short employment periods, which strain the work organization because of the need to hire substitutes. There is not enough time for confidential relationships to be built between the employees and the customers. Moreover, professional tacit knowledge is not utilized.

COMBINATIONS OF WILLINGNESS AND ABILITY RATINGS
Continuing to work until the age of 63 or older is based on combinations of willingness and ability ratings. Combinations of willingness and ability ratings were formed in the following way:

11= The person is willing and rates him- or herself to be able to continue working
12= The person is willing but rates him- or herself to be unable to continue working
21= The person is not willing but rates him- or herself to be able to continue working
22= The person is not willing and rates him- or herself to be unable to continue working

Figure 12. Willingness and ability to continue working until 63 years or longer among those under 26 years by the working culture at the working community (different enterprises, n=245).
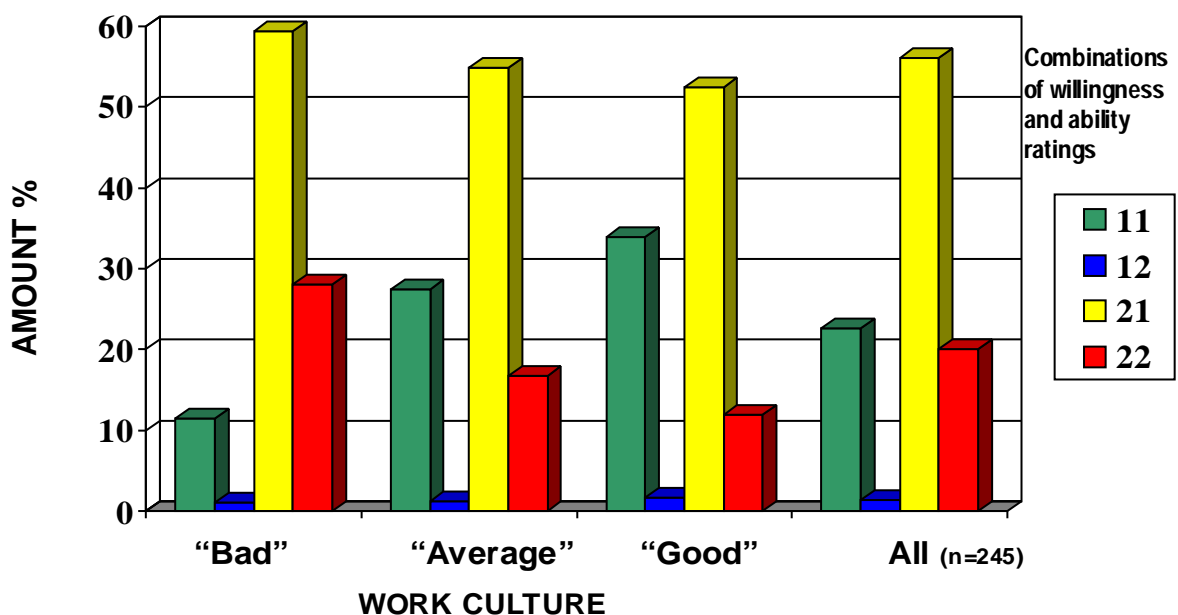
Figure 12 depicts the distribution of the employees' responses between four combinations of willingness and ability. The analysis concerns the youngest employees. The vertical axis shows the shares of those intending to keep on working as percentages. The horizontal axis represents the working culture. The categories of the working culture are "poor" or "bad", "average" and "good" or "well".

The majority of men and women under 26 years in poor working cultures are unwilling to continue working until the age of 63 or beyond. The green bar on the left edge of the figure indicates that only less than ten percent of young employees of this age working in a poor working culture wants to keep working until the targeted age limit (combination

number 11). The yellow bars reveal that the young employees do not want to continue even if they are fit (combination number 21).

SYMPTOMS AND PAINS AT WORK AND IN WORKING LIFE
Symptoms are common in working life. They do have a cause: they reflect a drawback, an unpleasant situation or discord between the human body and the environment.

The working community may display or not display symptoms. The working culture at the working community correlates with experienced symptoms and well-being of employees at work and with coping with the work in general. The working culture prevailing at the working community predicts the symptoms, working ability and well-being of employees.

Employees have a lot of symptoms due to fatigue and one-sided or excessive loading. In all sectors the most fatigued body parts are the neck and shoulder region and back. The sectors did not differ from each other based on the prevalence of these symptoms. Most women (80.4 %) report having experienced symptoms of the upper back region during last year. The costs for occupationally induced musculoskeletal disorders are staggering.

INCONVENIENCE INDEX
The inconvenience index describes the adverse effects of symptoms and pains in the neck-shoulder-back region on the well-being of employees at work. The index was composed as the sum of the scores indicating experienced inconvenience in seven different areas. The areas included in the inconvenience index are: My symptoms and pains make me tired, reduce my performance, have a negative effect on my mood, reduce my activity, interfere with my human relations at the workplace, the restrictions caused by my symptoms and pains cause conflicts at the workplace and make it difficult to cope with my daily work tasks.

DURATION OF THE WORK WEEK
With the exception of those employed in trade, employees of different ages and working in different sectors were working full-time about 40 hours per week at the time of the research.

The duration of a regular work week is the longest in metal and engineering industry (mean 40.6 hours) and shortest in trade and restaurant services (mean 29.8 hours). The average duration of the work week is 37.7 hours in the nursing and care sector and 39.0 hours in the children's day care sector.

THE DURATION OF THE WORK WEEK AND INCONVENIENCE CAUSED BY SYMPTOMS BY AGE GROUPS
Figure 13 has two parts. The left part shows the duration of a regular work week in hours. The right part reveals the inconvenience caused by symptoms and pains. The bars of both figures indicate averages calculated by age groups.

The left figure shows that the number of working hours is smallest in both the youngest and the oldest age groups. The figure on the right demonstrates how the inconvenience increases with the increased prevalence of symptoms and pains despite the fact that

the work week of the oldest workers is on average a few hours shorter than the work week of middle-aged adults.

A work week shortened by a couple of hours is not enough to compensate for the increase in inconvenience. Well-being experienced in work clearly diminishes with age.

Figure 13. Duration of the work week in hours and the inconvenience caused by symptoms and pains by age groups (enterprises of the business sector, n=1215). The inconvenience caused by symptoms and pains is indicated by the inconvenience index.

WORK HOURS IN A WEEK

INCOVENIENCE INDEX
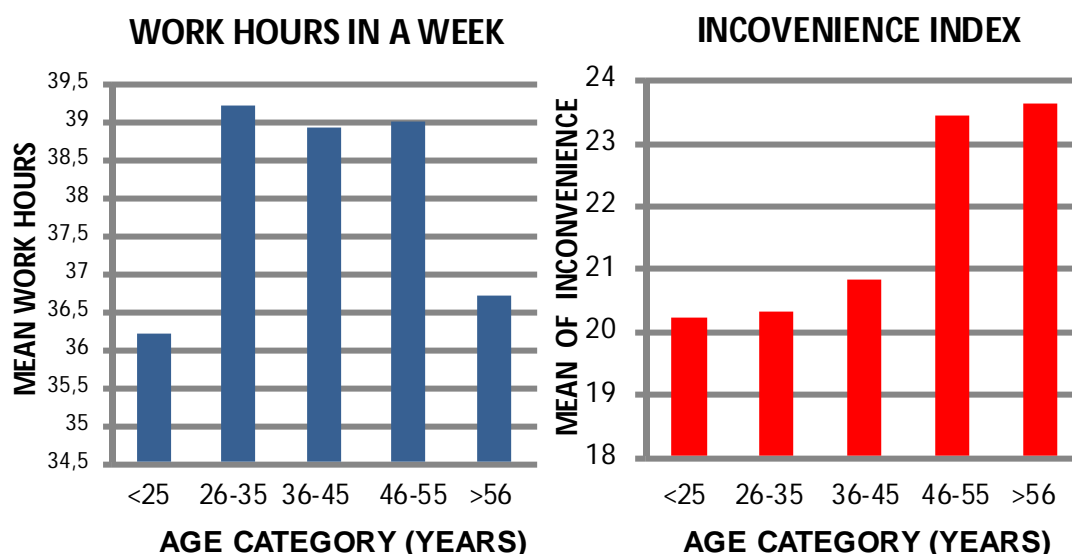
LENGTH OF EMPLOYMENT, WORKING CULTURE AND LIFE MANAGEMENT
The effect of the working culture and life management on the willingness and ability to continue working varies in different ages and stages of life. Coping with the work and continuing to work are the outcome of the simultaneous combined effects of factors related to work, the working community, and life outside the workplace (leisure).

LIFE MANAGEMENT
Life management was assessed on the basis of different areas of life and a life management index calculated from them. The assessed areas included health status, job situation, mental balance, family life, other human relations, financial situation, leisure, dwelling, and life in general. The index was divided into three categories in the same way as with the working culture index on the basis of the bottom tertile, top tertile and the median between these two tertiles.

In Figure 14, the working culture and life management are divided into three categories: ″bad″ or ″poor″, ″average″, and ″good″ or ″well″. As seen, satisfaction with one's own life, that is, good management of one's own life increases the willingness and ability to continue working even in work communities with a poor working culture

Based on this research material it can be concluded that good life management increases the number of those willing to keep working by about 20 percentage points

when the working culture is poor. The increase in willingness becomes evident if the two lowest green bars are compared.

The supporting and motivating power of life management is also evident in the case of an average working culture. When working in a good working culture, life management does not have an equally high motivational significance. Coping with the work and continuing to work are the outcome of the simultaneous combined effects of factors related to work, the working community, and life outside the workplace (leisure). It is highly shocking to note how efficiently the combination of bad working culture and bad life management reduces people's commitment to the work.

Figure 14. Willingness to continue working by work cultures and according to own life management. Life management and working culture have been classified in categories based on the distribution of the sums of index scores (all respondents, n=2720)
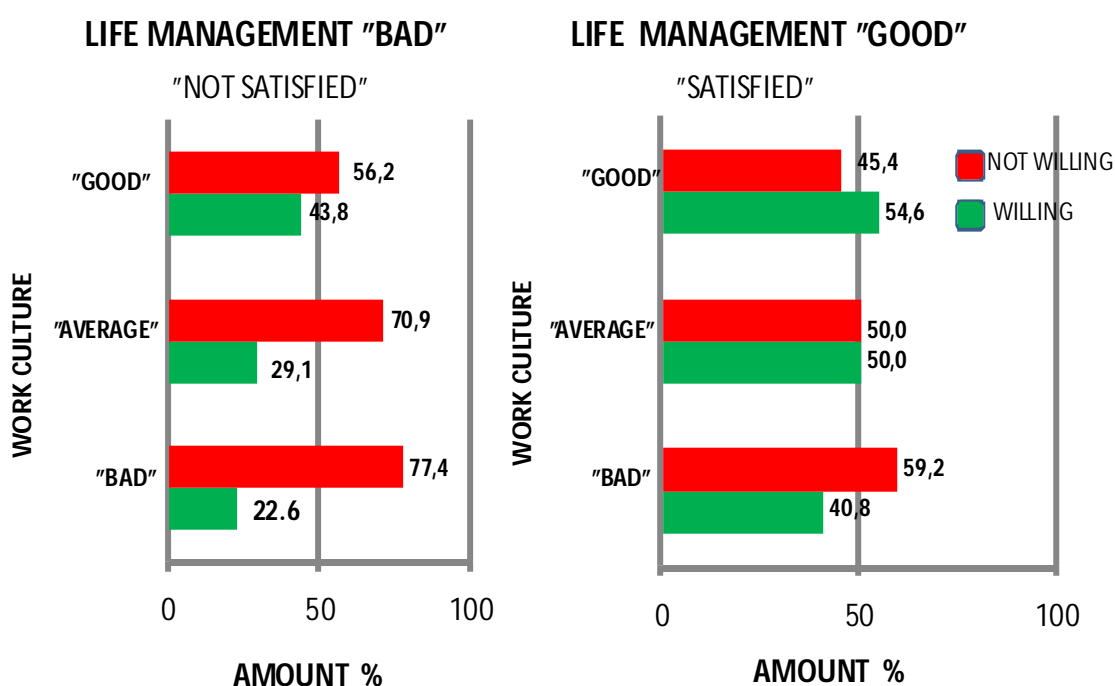
CONCRETE MEANS AND MEASURES TO PROMOTE EMPLOYEES' WILLINGNESS AND ABILITY

As the summary in Table 1 shows, we need a genuine interest in the operation of workplaces and enterprises, a real understanding of the working life, a reform of the procedures of working organizations, a new kind of cooperation between enterprises, educational institutions, authorities and experts, and comprehensive vision, high-quality information, openness, confidence, interaction, mutual respect and appreciation.

The significance of own control over work, design of work tasks and work time arrangements becomes evident when comparing the duration of the work week with the inconvenience experienced by employees due to symptoms and pains. Work time arrangements including part-time work are also a desired means to promote people's possibilities to continue working.

In the opinion of the employees, the reduction of the physical and mental workload and provision of meaningful work are the most important concrete ways to promote people's willingness and ability to continue working. A reduced workload and meaningful work can be achieved by dimensioning the staff corresponding to the needs and situations and managing the performance of work as well as possible.

The results of studies in various branches of industry also provide some convincing evidence that the effects of factors leading to earlier retirement may be considerably alleviated by ensuring that the work tasks assigned to employees are sensible.

Table 1. Summary list of means and measures to promote employees' willingness and ability.

_____

OWN CONTROL OVER WORK, DESIGN OF WORK TASKS AND WORK TIME ARRANGEMENTS

REDUCTION OF THE PHYSICAL AND MENTAL WORKLOAD

SENSIBILITY OF WORK, PROVISION OF MEANINGFUL WORK

ORIENTATION AND IN-HOUSE TRAINING AT THE WORKPLACES

THE SCHOOL TO THE WORKPLACES

ACCESS AND USE OF INFORMATION AT WORKPLACES

EDUCATION AND INFORMATION RELATED TO AGEING AND THE MAINTENANCE OF BOTH MENTAL AND PHYSICAL FITNESS

REFORMING MANAGEMENT OF LEARNING AND WORKLIFE RELATED TRAINING OF TEACHERS

MEASURES TO PROMOTE WELL-BEING AT WORK

_____

_____

This is an important consideration, since the results of the studies involved indicate that both the managers and employees find the sensibility of their work an equally important incentive as economic incentives when considering how long they want to keep working: three respondents out of four find economic incentives equally important as the sensibility of work. To promote the continued working and coping with the work among ageing personnel, a majority of the managers and employees in the target groups would like to have in-house training at the workplaces. In all branches, face-to-face in-house training and staff meetings at workplaces were experienced as the most productive and suitable means of training and dissemination of information. Use of the media and demonstrations were also felt to be suitable for the development of people's own working communities. The school is expected to come to the workplaces. Sitting in a classroom does not appeal to employees in enterprises. The people at the workplaces are unanimous that the access and use of information at workplaces must be increased. The employees desire education and information related to the function of the organization, ageing and the maintenance of both mental and physical fitness.

A majority (90.0 %) of those who did pause exercises at their workplace during working hours reported that this kind of active recovery periods helped them to cope with the work. Especially elderly employees found such active recovery pauses to support their coping with the work more often than younger employees.

The gathered data also show that roughly only one in ten small companies (exactly 8.0 %) has taken measures to promote the older workers' ability. Since a major part of enterprises all over the world are like these Finnish micro- and small-sized companies, it is perfectly clear that there is still much to be done. Besides the meaningfulness of the work and measures taken at enterprises to promote the work ability of elderly employees, the willingness of the respondents to continue working was related to their general satisfaction with their life.

THE NEED TO UPDATE THE WORKLIFE ABILITY OF TEACHERS

It has proved necessary to update teachers' knowledge about worklife to correspond to the present situation. From the point of view of the dissemination of relevant professional information and the development of workplaces, it is indispensable that teachers are ensured opportunities to maintain and develop their own worklife ability to keep in pace with the renewed needs for know-how. Good worklife ability also provides the teacher a solid reason to keep working. However, this is not always the case. The gathered information shows that in some cases the teacher's last visit to an enterprise or work organization representing his or her own field has taken place several years ago.

For many years the worklife ability network has collected information on the reasons for the teachers to stay apart from the working life, and at the same time we have developed experimental means to promote the teachers' knowledge of worklife. The feedback gathered from enterprises and teachers shows that we have succeeded in this development. For example, during their stay at the network's partner organizations, the teachers were able to update their knowledge to meet the current level either alone or working in pairs. One member of the pair was young and the other was old, or one was just starting his or her teaching career and the other had years or even decades of experience in teaching. Working in pairs offered the teachers an opportunity to learn from each other and provided encouragement to the party who experienced difficulties in entering the worklife.

LESSONS TO BE LEARNED

Partly due to the global economy, hectic and profound turmoils are taking place in the working life. Because of this, there is a growing tendency towards considering the globality of the modern work and work environment such as it is. It goes without saying that demands for correct and upgraded knowledge in this field are increasing greatly at work sites as the very result from new skill requirements and health issues.

The estimates of the respondents of the length of their working career and duration of employment vary greatly. There is no common view of the length of the working career and duration of employment. In all of the sectors under study, the working culture (including factors related to working atmosphere), management and coping with the work were the three most important and desired main categories of development at the workplace.

The results reveal that to keep on working the employee must have both the willingness and the ability to continue. Willingness or ability alone is not enough. A functional working culture forms the basis that promotes both the willingness and the ability to keep on working. Good control of one's own work, a functional working culture and

satisfaction with life are essential for helping employees to keep on working and to cope with the work. If employees stayed fit and were satisfied with their work, they would not need to change the workplace or retire early.

A dysfunctional working culture, excessive workload and inadequate means to control one's own work combined with the indisposition of the employees and their unwillingness to keep on working constitute a serious problem and threat with a view to both the availability and appropriate use of labour. Meaningful, sensible, less physically and mentally demanding work motivates care personnel to keep on working. A less loading work reduces the number of sick leaves, musculo-skeletal pains and syndromes and turnover, which in turn decrease the cost of recruiting and training of newcomers, Compared to work in other work organizations, the work done in elderly homes or with the elderly in general is more physically straining. Cooks, housekeepers and employees in catering services also find their jobs physically straining while those working in kindergartens and day-care centres experienced their job as mentally straining.

As the responses of the staff members show, the planning of the use of human resources, systematic job orientation at the workplace, and the continuous development of the management of one's own work are the very means that help prevent alienation, mistrust and uncommitment, the feeling of being an outsider at the working community, factors causing friction in one's own work, mistakes, threats and the risk of injuries or occupational diseases and accidents at work.

During past years a number of concerns about the quality of the elderly care have been expressed.

Real success in implementing the quality of care in elderly home requires a combination of measures. Improving the work culture and management style in working communities and lessening work load take priority over other means. Furthermore, the developmental activity of the care staff improves the well-being of the elderly. Especially in elderly homes, a functional and interactive working culture is of key importance with a view to the utilization of skilled workforce and know-how, coping with the work and continuing to work. The dimensioning of staff is an indicator of the quality of management. The human resources of the workplaces for the care for the elderly were the most scarce. Compared to work in other work organizations, the work done in elderly homes or with the elderly in general is more physically straining. A poor working culture at the workplace and excessive workload reinforce each other's effects in a negative way. This issue is very topical and important because human resources form the majority of the costs of elderly care and nursing. If competent people can be kept healthy and motivated to work longer than before, it may bring considerable benefits and annual savings for both the work organization and society at large.

The future is constantly present in the working life. To cope with the general challenges in the near future, we need multidisciplinary research and measures that take complex working and living conditions into account. Good work and a good life require adequate skills.

In particular, the results of the research projects show that the correct use of workforce and well-being at work require a number of simultaneous measures in the work organization. Work and the work community are viewed as a functional whole where different factors are intertwined and interacting.

The most important thing is to know how to combine the working ability of the staff and productivity: the business goals of enterprises are achieved most certainly with staff that is motivated, able, healthy, and satisfied with their work and their life. As our network's slogan says: "Well-being and ability spell success". In this context, it is necessary to underline casual relations and not to mess up causes and effects; experienced well-being and joy at work are effects caused by or results from combinations of work - and work community - related factors. Accordingly, arranging preconditions so people can experience success at work is the most critical issue.

The results of the experimental field study summarized in this review clearly show that consistent and well-designed face-to-face in-house training is an effective way to support the overall well-being and coping with the work of elderly employees. The observed positive changes in the well-being and coping with the work are particularly evident in ordinary (normal) companies and among those in poor physical conditions and with multiple symptoms. Due to the training at workplace included in the research project, the employee's sense of their possibilities to affect the ergonomics of their own work strengthened. Considering the future, another important observation was that the working culture of the company and the working community determines people's attitudes toward training, how the message is accepted and what kind of effects the training has on the staff at workplaces in general. It is evident that to succeed in his or her work the coach or trainer needs to know the prevailing working culture in the targeted work organization already at the design stage.

To meet the challenges posed by the rapid renewal of working life it is essential that society and the school are reformed at the same time. When society changes and renews, the school must also change and renew. Renewing is to be based on a holistic approach and a wide range of information.

The key factor in meeting the challenge is the management of learning and the vocational training of teachers, and worklife ability should be included in its curriculum. It is evident that the worklife ability and know-how of the students cannot improve if the teachers are not able to teach them. In practice this means that the know-how of the teaching staff must be updated to correspond to the knowledge and skills requirement of working life in a relevant way. For this, the schools must prepare a training programme for the entire teaching staff. It would ensure the systematic development of worklife ability. Instead of the management of teaching, the management of schools and training directors should show the way and manage learning in a way that corresponds to current renewal needs of worklife. Understandably, in the center again, there should be a reliable versatile view of modern work and worklife.

Considering all these work and life related phenomena, it is very urgent to conduct such holistic practice orientated approach, gather and disseminate such knowledge that is both relevant and helpful. This entity is described by the concept of worklife ability. "Worklife ability refers to the ability and willingness of persons to learn, apply and combine the latest know-how and knowledge related to products, work, work ability, working community, working environment and the business operations of the company (as well as their interconnections) in creative ways that benefit the individual, the company and society" (Manninen 2004).

ACKNOWLEDGEMENTS

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[1] This is an extensive Promotion of worklife ability (O Manninen: Työelämäosaamisen edistäminen) research project consisting of many parts with data gathered during 2003 – 2010. Right from the outset, the operation of the network was based on the views presented by the leaders of different companies and work organizations on the current development needs of the organizations and ways to promote the competitive edge and internationalization and to reform the contents of teaching in educational institutions, as well as and the vocational competence of the teaching staff. All management representatives interviewed in the hearings were totally unanimous that worklife ability forms the basis of everything. In their opinion, the systematic developing of worklife ability and the networked co-ordination of development are among the most important and topical issues in Finland. The views and opinions of the management representatives were charted by hearings arranged in the companies (n=91) in two stages during years 2003–2004. A central part of the research project is a follow-up study. The data were gathered by questionnaires, interviews, from documents and through observations during workplace visits. The cooperation between the working communities and the researchers has been excellent. The response rates of the questionnaires varied between 63 and 94. As the substudies have proceeded, the results have been presented to the targeted enterprises and work organizations in feedback and training sessions arranged for their staff. Both the management and the employees have attended to the sessions. The general public has been presented the results by several Studia generalia lectures organised by the network, and most of the related material are available in the material base at the home page of the Worklife Ability Networks (www.worklifeability.fi and www.tyoelama.fi). As applicable, the research material has also been published in the first textbook on worklife ablity [Handbook of Worklife Ability (O Manninen), Tampere, Finland, ISBN: 978-952-5264-75-3].

[2] The FourFive (O Manninen: NeljäViis) project charted the development needs and goals of productive enterprises that are related especially to how elderly employees cope with the work, the promotion of working ability, constant learning at the workplace, the development of intellectual capital and acquisition of information, as well as the development of working communities and environments. The target group consisted of enterprises representing branches under structural change, such as the textile and clothing industry, shoe and leather industry, building construction industry, building services industry and the passenger transport sector. Expert services were also included, as they are known to be a staff-intensive sector. All in all, the project's participants represented a total of 1212 enterprises and work organizations. The project was divided into three functional phases: sector chartings (n=263, n=322), company-specific (n=31) and individual (n=646) staff capacity and working ability chartings and related training and feedback sessions plus complementary analyses among the staff in enterprises (n=393, n=72).

[3] The involving Optimal contact teaching and information dissemination at workplaces (O Manninen: Optimaalinen lähiopetus ja tiedonjakelu työpaikalla) experimental study was addressed to 18 productive enterprises representing the textile and clothing industry and the shoe and leather industry. A total of 108 ageing female volunteers were selected for the study. The research setting was based on a 2-3-3 type variance analysis model. The results showed that at the end of the project the subjects suffered less upper and lower back symptoms. Likewise, the inconvenience caused by the symptoms had decreased. In general, the well-being and activity increased. The women also did more weekly fitness exercises at the end of the project than in the beginning.

CHALLENGES IN MANAGEMENT OF CROSS-SECTOR COLLABORATION FOR ELDERLY CARE

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ABSTRACT

The purpose of this research is to create new knowledge on collaboration management between organizations and actors of the public, private and third sector in the welfare service production for elderly. The development towards effective collaboration between public, private and third sector requires new ways of thinking, leading and acting. Furthermore new skills and forms of co-operation between partners are needed. The main issue is to investigate what kind of challenges are encountered in collaborative organizations and what are the dynamics and attributes that are needed to be emphasized when orientation is towards combined actions between different actors. Interviews and a workshop with representatives of service suppliers from the public, private and third sectors were carried out in order to identify the challenges in the cross-sector collaboration. As a result of this study new knowledge on management of collaboration between the public, private and third sectors is carried out. Furthermore the drivers that will have an effect on the network management style will be identified.

Key words: Cross-sector collaboration, Management, Elderly care

INTRODUCTION

Today's dynamic environment of economy is facing complex socio-economic problems. In order to meet complex social needs, the interdependence between people and organizations from different domains has increased continuously (Handy 1996, Lipman-Blumen 1996, Cleveland 2002). Whether the organization is a business, government or non-profit, it needs to recognize and to be aware that the collaboration across the sectors is imperative in order to solve complex and challenging problems from the social domain. Therefore cross-sector collaboration requires a great attention among researchers and practitioners from the social domain.

The continuous growth of the elderly population is one of the most serious social challenges encountered nowadays in many developed countries. In Finland, the situation is even more challenging because the aging rate is higher than the average rate within the European Union. The municipalities of Finland have the legal responsibility for providing care services to elderly, but the private and third sectors have also important roles in the welfare service provision.

Each year every elderly welfare service professionals and organizations are expected to function more effectively with fewer resources. Currently welfare services for the elderly are highly resource-oriented and do not always satisfy the customers' needs. In the future the main goal is to provide customer-oriented services for the elderly people. Also, the welfare service system is currently decentralized. An integrated service system is needed if cost reduction, effective usage of resources and quality improvement is aimed to achieve. In order to achieve all the previous goals, cross-sector collaboration (between public, private and third sectors) is crucially needed.

In the current welfare service system the collaboration between the three sectors is unplanned and there can be found many gaps in collaboration rate. There are also a lot of challenges regarding cross-sector collaboration while providing welfare services for the elderly. A solid partnership between the three sectors is also crucial in order to respond to current challenges in welfare services for the elderly. The optimized usage of resources, integration of the service system and improving the customer satisfaction can be attained via partnership to enhance the quality of life of the elderly. In order to assure an effective collaboration, the partnership between all three sectors has to be well managed. The management of partnership in cross-sector collaboration implies a lot of specific challenges that need to be recognized and identified.

The aim of this study is to recognize and identify the challenges that occur in cross-sector collaboration, generally, and specifically in the area of welfare services delivery for elderly. In order to gain this aim, we will start our study with a literature review to find out what are the most general challenges that are encountered in cross-sector collaboration. Thereafter, we will investigate the specific challenges for cross-sector collaboration in welfare services for elderly. While recognizing and identifying challenges in cross-sector collaboration management, in parallel we will investigate the drivers for an effective collaboration. Finally, all the challenges in cross-sector collaboration management and the drivers for effective collaboration will be put together, serving as a guide for an effective cross-sector collaboration management in welfare service delivery for elderly.

THEORETICAL BACKGROUND
Cross-sector collaboration and partnership

An increasing number of organizations are coming together to address the complex issues that confront our society today. Governmental agencies, business groups, non-profit organizations, community networks, educational authorities and individuals collaborate with each other to achieve common goals, such that would not be possible to obtain by working as individual actors (Gajda 2004). When working together in a coalition, individual entities can pool their limited resources to get better solutions for their activities. Also duplication of services can be minimized that way. Additionally, inter-agency dialogue can take place, common interventions can be developed, resources can be shared or centralized, and also resources can be sustained (Hogue et al 1995, Taylor-Powell et al 1998, Chalker 1999, Austin 2000, Calabrese 2000).

A coalition can be defined as "an organization of organizations working together for a common purpose" (Himmelman 2001). When working in coalition, organizations can meet different levels: networking, coordinating, cooperating, and collaborating. These levels can be assessed in relationship to the challenges and opportunities posed by time, trust, and turf (Himmelman 2001).

(I) Networking refers to the exchanging of information for mutual benefit; it does not require much time or trust nor the sharing of turf. This level of primary collaboration is met by organizations in their initial stages of working relationships.

(II) Coordination refers to the exchanging of information for mutual benefit and altering activities for a common purpose; it requires more time and trust but does not include the sharing turf. Coordination is used for example to create more user-friendly access to programs, services, and systems.

(III) Cooperation refers to the exchanging of information, altering activities, and sharing resources for mutual benefit and a common purpose; it requires significant amounts of time, high levels of trust, and a significant sharing of turf. Cooperation may require complex organizational processes and agreements in order to achieve the expanded benefits of mutual action.

(IV) Collaboration refers to the exchanging of information, altering activities, sharing resources, and a willingness to enhance the capacity of another for mutual benefit and a common purpose; it requires the highest levels of trust, considerable amounts of time, and an extensive sharing of turf. Collaboration also involves sharing risks, resources, and rewards and, when fully achieved, can produce the greatest benefits of mutual action in successful partnerships.

Over the past few decades cross-sector collaboration and partnerships have become widely adopted strategies while addressing social issues. It is often assumed that stakeholders collaborate voluntarily; sharing common goals and equal power with the aim of reducing uncertainty, acquiring resources and solving challenges (Hardy and Phillips 1998). Especially in the social domain cross-sector partnerships are forming to solve challenges in the areas such as healthcare, education, childcare, elderly care, environment, community and economic development, the arts and public safety (Googins and Rochlin 2000). Partnerships are widely adopted also in global arena. As businesses internationalize, the problems that were previously handled by non-governmental organizations, induces them to operate their business through partnerships.

The term cross-sector refers to the three primary institutional sectors of society: public (government), private (business) and third (non-profit). The reality is that a new socio-economic model is evolving, where the relationships between public, private and third sectors play a central role in achieving sustainable communities. None of the sectors have sufficient capabilities and resources to solve complex challenges from the social domain (Gajda 2004). By combining every sector's unique capabilities and resources the leveraging in societies can be obtained.

The potential of cross-sector partnership refers to two main issues. Firstly, engaging in partnership is supposed to combine every partner's unique capabilities, which allow them to gain benefits that any of the sectors could not get by acting in isolation. Secondly, the partnership provides an answer and an alternative to a system marked by competition, conflict and growing imbalance of power among sectors. In this context the partnership is a tool for turning divergent interests into collaboration with innovative ideas (Selsky and Parker 2005). Only that way the partners could get solutions to solve the complex social challenges that brought them together.

Collaboration constructs
Although collaboration has the capacity to connect fragmented systems with the purposes of addressing multifaceted social concerns, its definition is somewhat

theoretical, elusive and inconsistent (Gajda 2004). In her multidisciplinary research, Thomson (2001) made a review and analyzed a wide variety of definitions of collaboration.
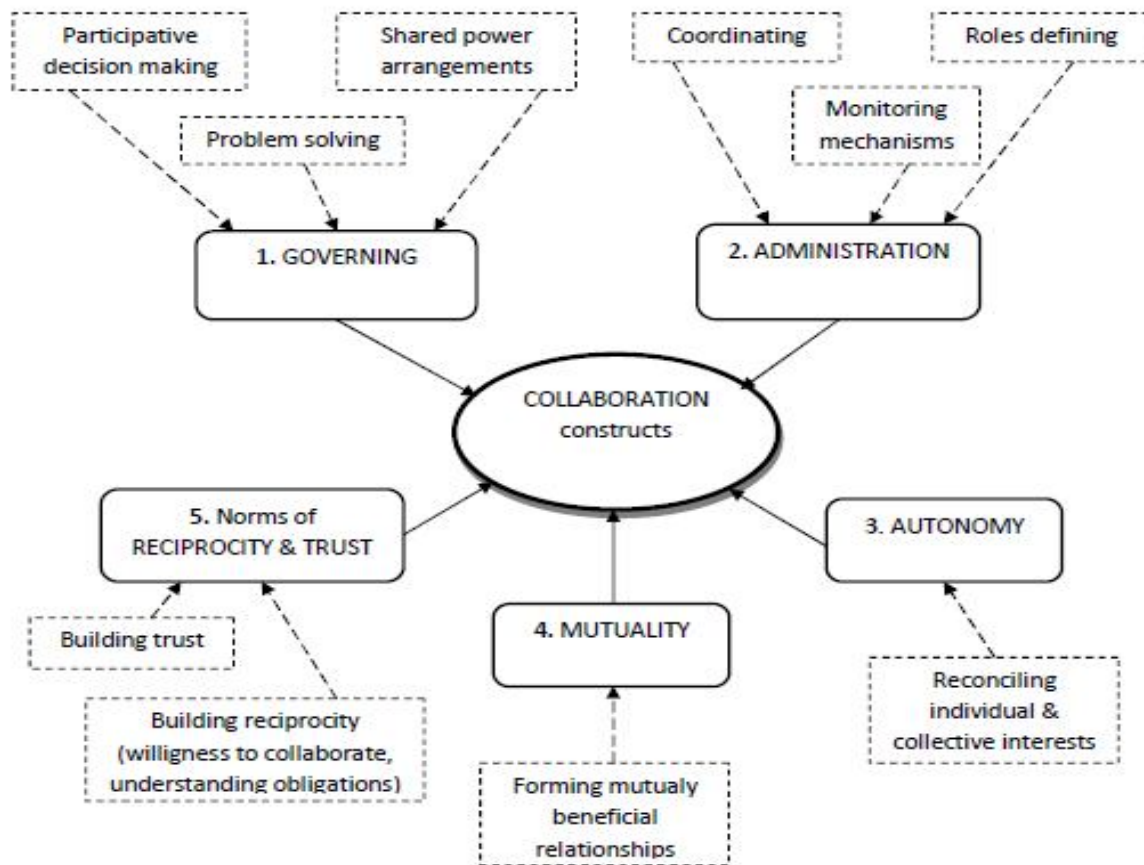
Figure 1. Collaboration constructs and their elements (based on Thomson 2001).

She concludes that the essence of collaboration processes can be distilled into five key dimensions: (1) the governing dimension, (2) the administration dimension, (3) the autonomy dimension, (4) the mutuality dimension and (5) the norms of reciprocity and trust dimension. In the Figure1 below are represented all the constructs of collaboration and their components.

The governing dimension: the process of collaborative governing
Partners who engage in collaboration must understand how to *jointly* make decisions. In the scientific literature on collaboration, the governance dimension is described in different ways such as participative decision making (McCaffrey et al 1995, Wood and Gray 1991), problem solving (Hellriegel et al 1986), or shared power arrangements (Clift et al 1995, Crosby and Bryson 2005). Collaborative governing implies the lack of hierarchies or authoritative structure (Huxham 1996); the awareness that participants must impose decisions on themselves and they are not only directly responsible for reaching an agreement (Gray 1989); the willingness to accept that every participant has legitimate interests, such that outcomes "reflect group consensus, not coalitional or power politics" (McCaffrey et al 1995); and the understanding that the collaborative governance emphasizes respect for others' opinions, openness in information sharing and potentially lengthy negotiations to reach agreement. Reaching agreements in collaboration does not mean everyone has to agree on the best possible solution; it only

means that everyone has to be willing to support the decision once it is made. (Thomson 2001).

The administration dimension: the process of collaborative administration
The key administrative functions identified in the hierarchical management literature — functions such as monitoring mechanisms, coordination and clarity of roles and responsibilities — are also emphasized in the collaboration research (Mattessich and Monsey 1992, Ring and Van de Ven 1994, Bardach 1998). Instead, in the literature on collaboration these functions take on new meaning in light of the more symmetrical and horizontal relationships. Although horizontal relationships imply decentralized administrative structures, it is still required a central position that coordinate communication, organize and disseminate information, and keep partners alert to the jointly determined rules that govern their relationships (Tschirhart et al 2005). Scholars of collaboration however agree, that the key factors in a collaborative setting to get the things done rests in social capacity to build relationships and finding the right combination of administrative capacity (through coordination and elements of hierarchy) (Sagawa and Segal 2000, Williams 2002).

The autonomy dimension: the process of reconciling individual and collective interests
The partners engaged in collaboration share a dual identity: the own (organization's) identity and the collaborative identity. This reality creates a tension between self-interest — achieving individual organizational missions - and a collective interest - achieving collaboration goals and maintaining accountability to collaborative partners and their stakeholders (Van de Ven et al 1975, Wood and Gray 1991, Bardach 1998, Tschirhart et al 2005). Huxham (1996) referring to this tension emphasize that because "collaboration is voluntary, partners generally need to justify their involvement in it in terms of its contribution to their own aims" or refrain from collaborating altogether. The autonomy dimension contrasts shared control with individual control (Wood and Gray 1991). Usually partners try to protect their own identities in collaboration by maintaining individual control. Shared control, on the other hand, involves partners' willingness to share information, not only about their own organizations' operations but also about what they can and cannot offer in collaboration. Himmelman (1996) argues that a distinguishing characteristic of collaboration is the willingness to share information for the good of partners (even at the risk of compromising a particular organization's autonomy). On the other hand Gray (1989) and Wood and Gray (1991) emphasize that sharing information in collaboration needs to be seen in terms of increasing partners' understanding of the problem they are jointly seeking to address.

The mutuality dimension: the process of forging mutually beneficial relationships
Although information sharing is imperative for collaboration, by itself it is not sufficient to succeed. Without mutual benefits, information sharing will not lead to collaboration. Collaboration partners must experience mutually beneficial interdependencies. They are based either on differing interests – complementarities - or on shared interests, such as a humanitarian crisis or the moral imperative of environmental degradation (Powell 1990). Complementarities refer to the situation when one party has unique resources (skills, expertise, or money) that another party needs or could benefit from (and vice versa). "Collaboration can occur as long as stakeholders can satisfy one another's differing interests without loss to themselves" (Wood and Gray 1991). The most important variable in explaining collaboration outcomes was the organizations' need to "acquire resources from other organizations that they need and do not have but are critical for their continuing functioning" (Chen and Graddy 2005). If the partners perceive

mutual benefits from the collaboration the commitment will increase. But the commitment is unlikely without trust and reciprocity.

The norms of trust and reciprocity dimension: the process of building social capital
Reciprocity can be conceptualized in two different ways: the first one is short term reciprocity, and another one is long term reciprocity (Axelrod 1984, Ostrom 1990, Powell 1990). The short time reciprocity refers to the willingness to collaborate, while the second one refers to the understanding of obligations. Often partners demonstrate willingness to collaborate only if other partners demonstrate the same think. This "I will if you will" mentality is based on the perceived degree of obligation. Over time, as collaboration partners learn what works and what does not work, individual participants know their roles and obligations (Ostrom 1998). Reciprocity is a critical factor in successful collaboration. Closely related to reciprocity is trust. Trust is a critical component of collaboration, but trust building takes a lot amount of time and nurturing. Additionally trust reduces complexity and transaction costs more quickly than other forms of organization (Smith 1995, Chiles and McMackin 1996, Ostrom 1998).

Due to the complexity of collaboration and the dynamism that collaborations can create, public managers may be induced in management difficulties. Managers and individual partners who understand the variable and the complex nature of these five dimensions of collaboration, are better prepared to engage in collaborative activities than those who focus merely on achieving individual goals through collaboration (Thomson 2006). It is argued that instead of insisting in reaching the highest level of all five dimensions of collaboration, the challenge for collaboration managers and partners is to seek for a balance among these five dimension trough incentives for renegotiations and mutual accommodation.

Challenges in cross-sector collaboration
An important segment of the literature on cross-sector collaboration emphasizes the merits and benefits of organizations' collaborating (Child and Faulkner 1998, Doz and Hamel 1998, Kanter 1994, Linden 2002). On the other hand an increasing number of studies warn leaders and managers about the complexities and difficulties of these types of organizational partnerships (Frisby et al 2004, Hodge and Greve 2005, Huxham 1996, Huxham and Vangen 2000a, Provan et al 2004, Wondolleck and Yaffee 2000). Wondolleck and Yaffee (2000) argued that it is very important to understand the difficulties facing the development of cross-sector partnerships and to provide insight into how these challenges have been overcome in practice by managers and leaders.

Although cross-sector collaboration has reached an increasing interest in practice also, many times the management of cross-sector collaboration is unconsidered. Frisby et al (2004) revealed in their study on cross-sector partnerships that the management function of partnerships was often neglected by organizational leaders. The authors found that cross-sector partnerships were generally undermanaged. As a result these partnerships were plagued with problems of inadequate managerial structures and inadequate managerial processes. Inadequate managerial structures refer to the lack of clear planning and policy guidelines, insufficient human resources, unclear roles and information sharing models. Inadequate managerial processes included insufficient time devoted to partnerships, lack of communication, strategies and evaluation, poor coordination, insufficient supervision, insufficient training and difficulties negotiating competing values.

Another set of challenges in cross-sector partnerships refers to differences in organizations' goals and objectives, in values, in language, in procedures, in culture and power (Smith et al 1995, Huxham 1996, Coulson 2005). Huxham (1996) argues that these challenges led to organizations' not realizing their full collaborative advantage. For example, differences in values, beliefs and expectations may end up pulling a non-profit organization in potentially incompatible directions (Alexander 1998). On the issue of differing values between partnering organizations across sectors, Carroll and Steane (2000) proposed the following explanation: "Partnerships between business, government and non-profits can be problematic when values clash. . . . Values or ideology can influence motivations, beliefs, norms of behavior, and new expectations in managing and delivering a service. In some partnerships, this may take the form of more conscious and overt consideration of the intangibles. For others, priorities regarding efficiencies and transparency may challenge non-profit partners to engage [in] management practices more aligned with the corporate world."

In their study on cross-sector partnerships within the U.K. refugee system, Hardy and Phillips (1998) maintained that several issues might impair partnerships, including questionable management practices, unfairness, exploitation, repression, and asymmetrical power relations. Although organizations enter into partnerships to capitalize on opportunity and reduce uncertainty, factors such as the loss of autonomy in decision making, power, conflict, and control may create challenges and raise additional uncertainties. Ironically, these issues are often neglected in the literature on cross-sector partnerships (Gray 1989, Oliver 1990, Park 1996, Child and Faulkner 1998, Hardy and Phillips 1998, Linden 2002).

Wondolleck and Yaffee (2000) discussed the existence of some other barriers or obstacles in effective cross-sector partnerships. These barriers refer to constrained resources, lack of opportunity or incentive to collaborate, mistrust, inflexible policies and procedures that do not support the partnership, group attitudes about each other that may not be accurate and lack of support or commitment to the partnership. In the context of cross-sector partnerships, Andreasen (1996) identified also consequences associated with the ineffective management. The consequences include wasted resources (invested time and effort, which may compromise other activities), loss of organizational flexibility (partners may impose restrictions and limitations), and structural atrophy (a heavy reliance on one partner or investments of time and energy in maintaining one relationship instead of dedicating energies to exploring the potential of alternative partners). Along similar lines, Eisenhardt and Schoonhoven (1996) suggested that partnerships may prevent managers from taking an initiative in developing essential organizational skills and capabilities because their partners already have them, thereby lulling the managers into a state of complacency. Further compounding these challenges, the issues of self-interest and competition play a role in contributing to tensions in the coordination of multiple cross-sector partnerships.

The competitive–collaborative issue is also a challenge that merits further discussion. This refers to the situation in which an organization simultaneously experiences both facilitating and constraining interdependencies (García-Canal et al 2003; Parise and Casher 2003). Pressures from external agencies to form partnerships (e.g., government) and efforts to be more efficient, cost conscious, and professional have led organizations to engage in partnerships. At the same time tensions may be introduced while trying to acquire scarce resources and seeking credibility and legitimacy in a competing manner.

We are proposing to contribute to the literature on cross-sector partnerships by addressing these concepts collectively and by addressing the challenges organizations face as they undertake partnerships with organizations from different sectors. In the following section, we present the research methods we carried out to address multiple cross-sector partnerships in the case study of welfare services delivery for elderly.

RESEARCH METHODS

The data of the study was collected by interviews and a workshop. Interviews with key representatives from all three sectors were conducted (three persons from each sector). They have experience in elderly services delivery and many of them have also direct contact with elderly clients in their activities. Also a workshop with experts (eight persons) from all three sectors was carried out. The participants selected for the workshop session were managers from the public, private and third sectors and they have wide experience in welfare services delivery. A list with the challenges identified during the interviews was given to the workshop participants and they were asked to complete the list of challenges.

The list of challenges in the management of cross-sector collaboration identified during the interviews and the workshop were categorized according to the theoretical framework of collaboration dimensions. Then every category of challenges was analyzed separately, using the Force Field Analysis method (Lewin 1951), trying to identify solutions (or driving forces) to solve challenges and to implement the change management.

RESULTS

CHALLENGES IN THE MANAGEMENT OF CROSS-SECTOR COLLABORATION FOR ELDERLY CARE

The challenges in cross-sectoral collaboration are listed below, starting with the most challenging issues, perceived by the participants during the workshop.

- fragmentariness of services: services are dispersed and old people have difficulties in finding service and piecing together all the welfare service system provided to them. They need guidance from family and friends, or a specialized guidance provided by service system. The need for service integration is a priority in the present service system;
- uncertainty relating the activity of other organization conducts to ineffectiveness in the use of resources; disconnectedness of information: nobody has the information regarding wholeness of the service system; Information flow between different service suppliers is disconnected. Everyone manages its own job and the overall situation remains unclear; the management of partnership: leadership, strategic goals, strategies of actions, information sharing etc. must be planed and designed in order to assure an effective management;
- limitation of the resources (financial, personnel, leadership) cannot provide always customer-oriented services;
- keeping in touch organizations' rules: if the rules are unclear cannot be assured an effective management.
- new operation models for the elderly services are required. They could provide more active life to customers;

- quality control: developed programs for quality control are required in order to provide costumers quality of services;
- common rules and modes of action are required for services effectiveness and customer satisfaction;
- continuity of collaborative projects must be planned. There have been many successful projects (ex. widow project) founded by public sector to the third sector for a limited period. The problem is that when the projects finished, it hasn't been planned any continuity for them;
- volunteer sector requires more support: recruiting and commitment policies, activity expanding, financial support;
- bureaucracy and hierarchies in public sector cause a lot of problems in the collaboration process.

STRUCTURING CHALLENGES BY COLLABORATION DIMENSIONS

The challenges were categorized according to collaboration constructs. It was a little surprising in the beginning the fact that the challenges discovered during this study are related only to governing and administrations dimensions. The categorization of challenges is presented in Table1.

From the Table 1 it can be observed that the most of the challenges belong to governing dimension, followed by the challenges belonging to administration dimension. The results confirm the fact that the collaborations between public, private, and third sectors in elderly care is very weak and it is not managed well. There is a huge need for elaborating a strategic partnership between the three parts.

The fact that during the interviews and workshop were not discovered any challenges related to the other three dimensions of collaboration (autonomy, mutuality and norms of reciprocity and trust) indicates that the collaboration between the three sectors is not at a high level. These three dimensions (autonomy, mutuality and norms of reciprocity and trust) are emphasized in the case of high level of collaboration. If the basic elements of collaboration are in a very weak position (lack of strategies, limitation of planning) it is clear that the other dimensions are inexistent at this level of collaboration.

FORCE FIELD ANALYSIS FOR CHANGE MANAGEMENT IN CROSS-SECTOR COLLABORATION IN ELDERLY CARE

The Force Field Analysis is widely used particularly in planning and implementing change management programs in organizations. It is a simple and powerful visual tool consisting of driving and restraining forces for change and to examine ways of increasing the positive, driving forces and reducing the negative, resisting forces (Lewin 1951).

In this study Force Field Analysis is used as a visual tool that helps the understanding on how challenges should be solved in order to change and improve the management of cross-sector collaboration in elderly care. The analyses are divided into two groups, as the challenges were categorized earlier: the challenges related to governance and the challenges related to administration. In order to form a strategic partnership, the first steps are the implementation of policies for governing and implementation of policies for administration of partnership. A change management plan was realized in each case, using the Force Field Analysis (Figure 2 and Figure 3).

Table 1. Challenges in the management of cross-sector collaboration for elderly care, categorized by collaboration dimensions.

1. GOVERNING -problem solving -participative decision making -shared power arrangements	2. ADMINISTRATION -coordinating -defining roles -monitoring mechanisms
weak management initiative	fragmentariness of services
limitation of leadership	uncertainty relating the activity of others
lack of strategies of actions	lack of common rules and modes of actions
limitation of personnel resources	disconnectedness of information
limitation of financial resources	unclear organization's rules
rigid operation models	lack of quality control
no continuity of collaborative projects	-
volunteer sector operates much in isolation	-
weak position of volunteer sector	-
bureaucracy and hierarchy in public sector	

CONCLUSION

During the study it was investigated what are the challenges in the management of cross-sector collaboration for elderly care. The results show that the present challenges are related to the governance and the administration dimensions of collaboration. There were no identified challenges related to the other three dimensions of collaboration: autonomy, mutuality and norms of reciprocity and trust. This suggests that the management of cross-sector collaboration between the three sectors for elderly care is still at an incipient level. The results of the study clearly indicate that there is a need to initiate a strategic partnership between public, private and third sectors for elderly care. This requires meticulous attention in the management of partnership.

With this study we got the beginning for the future research. We got a guideline that indicates on which issues the management of partnership should concentrate. Even if at this stage of collaboration there were no identified challenges related to autonomy, mutuality and norms of reciprocity and trust, special attention should be accorded separately to every dimension. An effective management of partnership requires finding equilibrium between all the dimensions of collaboration, as well.

DRIVING FORCES   **CHALLENGES**

| Initiate a strategic partnership well managed | | Weak management initiative |

| Recruiting competent and committed leadership | | Limitation of leadership |

| Motivation strategies for engagement in elderly care (for workers, firms and volunteers) | | Limitation of personnel resources |

Plan:

Implementing

Governance

Policies for strategic partnership

| Integration of service system to improve effectiveness (eliminate parallel similar activities) | | Limitation of financial resources |

| New and flexible operation models | | Rigid operation models |

| Planning continuity of collaborative projects | | No continuity for collaborative projects |

| Collaboration planning (strategies) with volunteer sector | | Volunteer sector operates in isolation |

| Financial support for volunteer sector | | Weak position of volunteer sector |

| Few levels of hierarchy | | Bureaucracy and hierarchies |

Figure 2. Force Field Analysis to solve challenges related to governance.

DRIVING FORCES

CHALLENGES

Integration of service system

Fragmentariness of services

Interaction, commitment and increasing trust

Uncertainty relating activity of others

Plan:

Implementing

Administration

Information sharing models

Disconectiveness of information

Policies for strategic partnership

Keeping in touch organizations' rules

Unclear organizations' rules

Quality control mechanisms

Lack of quality control

Common rules and modes of actions

Lack of common rules and modes of actions

Figure 3. Force Field Analysis to solve challenges related to administration.

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ASPECTS CONCERNIG THE MANAGEMENT OF THE ORDERER-PRODUCER PROCESS

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THE GOAL IS A WELL MANAGED PROCESS RESULTING IN ZERO ACCIDENTS AND MISTAKES

The recent development in our country in relation to workplace safety is worrying. Especially the continuing increase in the number of workplace accidents raises serious concerns. The question needs to be asked how we arrived to the present situation, which appears to be a very grim one indeed. The statistics of workplace accidents in different sectors are showing clear differences in developments. The traditional industry seems to be able to operate safely but many growing sectors seem to suffer from incapability when it comes to prevention of workplace accidents, malfunctions and mistakes.

Numerous examples in Finland and elsewhere clearly demonstrate that all workplace accidents are preventable but it requires will and hard work to do so. All agents in the working life need to understand and embrace the importance of a true culture of work safety and good procedures. Without the change of attitudes of each agent, it is futile to expect that a miracle will put right procedural errors and faults which are causing dangers and hazards.

MANAGING HEALTH AND SAFETY

The certainty is that various significant things will happen in a workplace when management decides to treat safety as an achievable development goal. But if the management decides to carry on with a questionable situation without corrective steps being taken, anything may happen. It is obvious that each employee needs to be careful and take responsibility for his or her own actions when it comes to safety, but the management needs to comprehend that workplace safety is their legal duty.

Suitable tools for managing safety are:

- assessment of dangers and hazards
- risk assessment
- health and safety policy
- proper and up-to-date health and safety procedures
- continuing follow-up and audit
- training where necessary
- open communication and information flow
- showing initiative and encouragement

The full responsibility of workplace health and safety cannot be transferred away from the management, and to an extent it is always present directing the decision-making process. Tackling matters decisively, utilizing different expert services available and also establishing workplace cooperation will together provide a good starting point in managing health and safety. Continuing improvement of working conditions is a

demanding but also a rewarding goal. It demands a similar frame of mind as managing quality and typically emphasizes prevention. Even though it can be effective sometimes to learn from mistakes, it can also be fatal, and for that reason safe processes and effective supervision of these processes should be developed.

COOPERATION OF ORDERER AND PRODUCER

Many organizations have for a long time operated a strategy where the focus is on core production and developing these to be ever more competitive, and thus many services required are obtained from outside. At the same time, outsourcing of previously in-house processes may occur. The significance and the quantity of these services vary between organizations.

According to experience, the risk factors of services or products provided by third party suppliers are various in relation to health and safety. The processes of the suppliers may be operationally different and whether these processes are compatible with the orderer may still to be tested. When an organization buys various products or services from a producer the selection of the supplier should be careful and anticipatory. When designing demanding projects, it should be taken into account that external agents' actions and effects require careful consideration.

The orderer bears the cost for the whole operation. However, this does not mean that the orderer is in control of the whole operation. Often the supplier's products are highly specialised or such in their nature that the orderer does not fully comprehend their suitability or characteristics. Many commissions might fail for the reason that the supplier defines the product using its expertise in such a way which never was the orderer`s intention.

The well worn out saying that quality does not come cheap, is unfortunately true more often than not. On the other hand, an expensive product might not be suitable for the orderer nor its price justified by its characteristics. The quality requirements of the product need to be defined sufficiently and well in advance by the orderer. When comparing the bids it is advisable for the orderer also to clarify the safety and quality implications of the products. Otherwise the orderer might find itself disappointed and in a position where it needs to pay damages or compensation.

COHERENT COLLABORATION

The orderer and producer need to manage operations and practices effectively. It is necessary to establish agreed practices to a detailed level specially relating to collaboration. Operational differences arising from varying practices need to be clarified well in advance to avoid problems. Required communication channels and shared reporting should be established, and audits, too. It is necessary to make it possible to rapidly tackle possible errors or actual dangers and damages; operating in such a way forms a part of continuously developing collaboration. Deepening cooperation is a learning process which may form a basis for continuing collaboration if it is seen as mutually beneficial.

POSSIBILITIES OF COLLABORATION

The orderer and producer can trust each other, provided that both parties share the same values, feel that they can continue working together in future projects based on mutual benefit, and that collaboration as a central part of managing health and safety is correctly understood. At the same time, any development of health and safety practices is easily initiated. If the mutual trust is lacking, health and safety issues will require

tighter monitoring and on occasion even forceful measures. In such situations there probably is little collaboration.

Examples of collaborative values may be:
- importance of know-how
- meaning of smooth and quality-based operations
- prevention of errors, delays, dangers and damages
- need for shared audits
- common language and rules
- managed operations as a goal

FORMULATION OF COLLABORATION
As Figure 1 demonstrates, continuous improvement and monitoring are the leading principles.

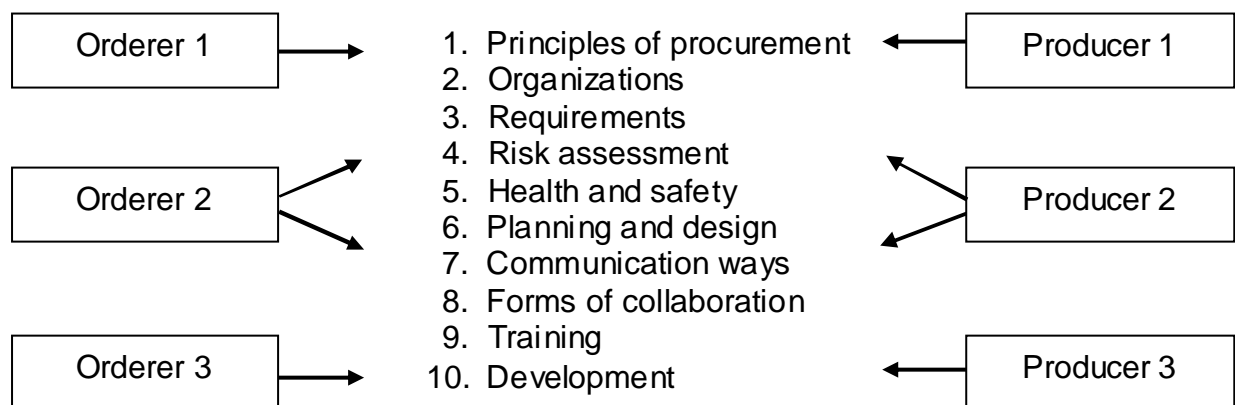| Orderer 1 | → | 1. Principles of procurement | ← | Producer 1 |
| Orderer 2 | → | 2. Organizations
3. Requirements
4. Risk assessment
5. Health and safety
6. Planning and design
7. Communication ways
8. Forms of collaboration
9. Training | ← | Producer 2 |
| Orderer 3 | → | 10. Development | ← | Producer 3 |

Figure 1. Example of formulation.

TRIAL FOR SERVICE QUALITY MANAGEMENT IN HEALTH PROMOTION FACILITY FOR THE MIDDLE AGED PEOPLE

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ABSTRACT
The purpose of this study was to extract the strong and weak points by measurement of the service quality of our facility, and the result of efforts to improve them. The subjects were 150 members on the health promotion facility. The questionnaire survey was conducted for facility members to measure service quality. The quality of services was measured using ten elements. Both the importance level and performance level of each element were ranked into seven levels in the first research. The difference of the mean value between the importance level and performance level of each element was verified using the Student's t-test. We performed an improvement of the service quality for two months with a focus on the exercise program and cleaning of the facilities and equipment. We also investigated the performance level by the same questionnaire as in the previous survey. After our effort to improve the service quality, the performance level of the exercise program had slightly decreased, while room condition had improved. Moreover, an improvement of the performance level was shown in six of the ten elements of service. The activity for service quality improvement based on the objective findings is effective for health promotion facilities management.

Key words: Service quality management, Health promotion facility, Middle aged people

INTRODUCTION
A health promotion facility is controlled by the medical law of Japan. Such a facility is established as an annex to a hospital. It differs from the sports club that private companies manage. The members of a health promotion facility attached hospital perform aerobics exercise and muscle strength training for health promotion. Our hospital also includes a health promotion facility. The facility comprises an Aerobics area, Stretching and Muscle strength training area, and Outdoor area (see Figure1). Our facility can be used by a person for various purposes. For example, the facility can be used for health promotion, follow-up after rehabilitation (Kumazaki et al 2006), prevention or treatment of lifestyle-related diseases, and cooperation with medical treatment. Therefore, the exercises performed at a health promotion facility should be effective and safe. The features of our facility are instruction of effective and safe exercises, counseling to our members and members from other facilities (Kumazaki et al 2010), sessions on health promotion to senior members, and measurement of physical fitness.

MATERIAL AND METHODS
We have managed a health promotion facility attached hospital. We are always making an effort to improve the service quality. In this study, we extracted the strong and weak points by measurement of the service quality of our facility, and the result of efforts to improve them.

| Aerobics area | Stretching and Muscle strength training area | Outdoor area |

Figure 1. Our health promotion facility. There are an Aerobics area, Stretching and Muscle strength training area, and Outdoor area in our facility.

SUBJECTS

The subjects were 150 members, whose mean age was 62.8 years, of the health promotion facility.

METHODS

This study consists of the following the first research about the service quality before the activity for a service quality improvement, intervention by the activity for a service quality improvement, and the second research about the service quality after the activity for a service quality improvement (see Figure 2).
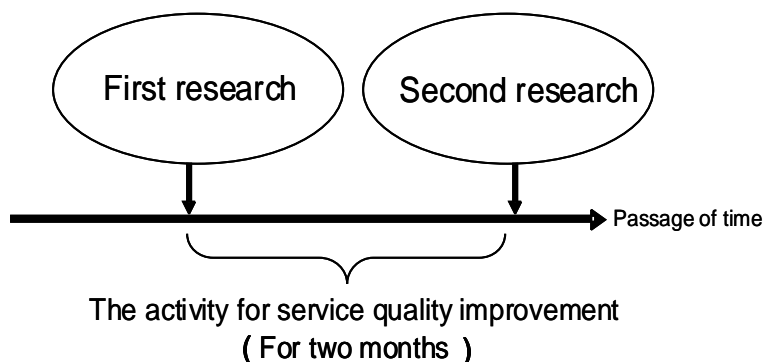
Figure 2. Flow of study.

First, we extracted our service items and identified present problems of our service quality by a SWOT (Strength-Weakness-Opportunities-Threats) analysis based on a questionnaire survey to facility members. The questionnaire survey was conducted for facility members to measure service quality. The effective response rate was 86. The quality of services was measured using ten elements (20 items, two for each element): medical security, program, staff, room condition, facilities and equipment, sociability with members and/or staff, physical effect, emotion, information, and user manners (see Table 1). Both the importance level and performance level of each element were ranked into seven levels in the first research. Importance level shows the member's expectation for service. Performance level shows the member's evaluation of the service. The service quality is calculated by the difference between the importance level and

performance level. The difference of the mean value between the importance level and performance level of each element was verified using the Student's t-test.

Table 1. Service assessment items. The quality of services was measured using ten elements.

Element of service | Service item

Medical security	—	Facilities managed by the hospital Coach of the staff who has medical treatment qualification
Program	—	Program that wants to participate Enhanced program and coach
Staff	—	Communications with staff The staff's good correspondence
Room condition	—	Cleanness in facilities Goodness of atmosphere of facilities
Facilities and equipment	—	The equipment of facilities is in order The equipment of facilities is clean
Sociability with members and/or staff	—	Exchange with other members The friend and the acquaintance are made
Physical effect	—	Achievement of moving reason Improvement of physical strength and physical condition
Emotion	—	Pleasure to coming to facilities Pleasure that selected this facilities
Information	—	Easiness of event and information to obtain Easiness to inquire
User manners	—	Rule and manner of other members Image of facilities given by member

As the second step, based on the result of the first research, we performed an improvement of the service quality for two months with a focus on the exercise program and cleaning of the facilities and equipment. Regarding the exercise program, we reviewed each member's exercise program again. If it was necessary, the exercise program was changed. In the cleaning of the facilities and equipment, it was decided to post the check table in the facilities, and to check it three times a day (the morning, the afternoon, and the evening). Moreover, the cleaning equipment was set up in the facilities.

Finally, we also investigated the performance level by the same questionnaire as in the previous survey to evaluate the effect of our activity in the second step. We determined the valid response by answers to both first and final survey (n=68). The service quality was measured by comparing the performance levels between the first and second researches.

RESULTS

In the first research, the performance levels of room conditions, facilities and equipment, and physical effect were low compared with their importance level. It is necessary to improve the performance level more with a view to the high importance level of the improvement of the service quality. We performed the activity for the service quality improvement based on the result of the first research.

As a result of having performed the activity for a service quality improvement, the staff checked the member's exercise program positively. The communication of the staff and members increased. The staff found the place more unclean than before, and cleaned up positively.
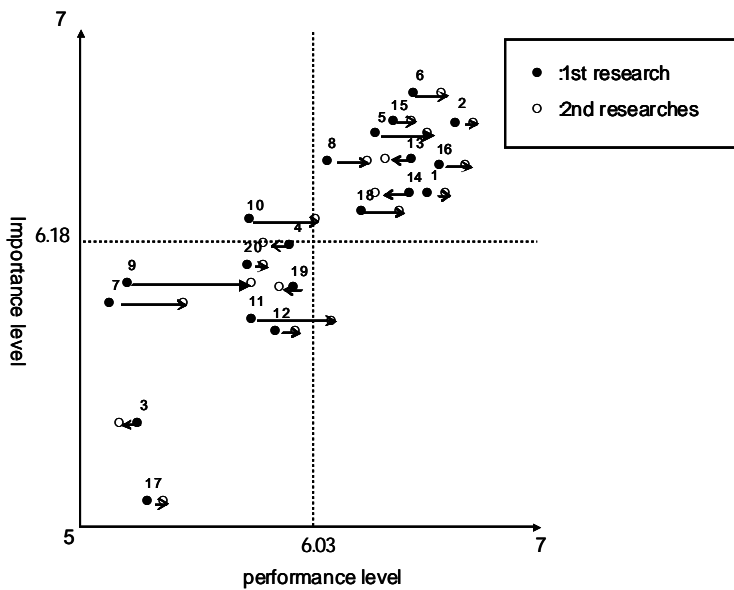
Figure 3. Change in service quality

An improvement of the performance level was shown
in fifteen of the twenty items of service.

In the second research after our effort to improve the service quality, the performance level of the exercise program had slightly decreased, while room condition had improved. Moreover, an improvement of the performance level was shown in six of the ten elements of service (see Table 2, Figure 3).

Table.2.- Importance level and performance level of mean and gap

Element of service	importance level	performance level (1st research)	performance level (2nd research)	Gap 1 (1st research)	Gap 2 (2nd research)
Medical security	6.58	6.56	6.62	0.02	-0.04
	6.65	6.67	6.72	-0.02	-0.07
Program	5.40	5.30	5.28	0.10	0.12
	6.02	5.88	5.76	0.14	0.26 *
Staff	6.52	6.28	6.51	0.24	0.01
	6.64	6.45	6.58	0.19	0.06
Room conditions	6.30	5.92	6.26	0.38 **	0.04
	6.42	6.10	6.28	0.32 *	0.14
Facilities and equipment	5.92	5.20	5.71	0.72 **	0.21
	6.20	5.76	6.05	0.44 *	0.15
Sociability with member and/or staff	5.86	5.78	6.12	0.08	-0.26
	5.83	5.84	5.94	-0.01	-0.11
Physical effect	6.43	6.48	6.37	-0.05	0.06
	6.56	6.31	6.15	0.25 *	0.41
Emotion	6.42	6.39	6.45	0.03	-0.03
	6.32	6.44	6.58	-0.12	-0.26
Information	5.05	5.31	5.36	-0.26	-0.31
	6.30	6.24	6.43	0.06	-0.13
User manners	5.95	5.87	5.84	0.08	0.11
	5.97	5.78	5.81	0.19	0.16

importance level, performance level (1st research), performance level (2nd research) : mean $*P < .05$ $* *P < .01$

Gap 1: (importance level) - (performance level 1st research)

Gap 2: (importance level) - (performance level 2nd research)

DISCUSSION

In the ranking of the importance level in the first research, the service element of medical security, staff, and physical effect received a higher rank. Reliability, correspondence and sense of security in the service factor were important in the service quality (Parasuraman et al 1988). The service quality in the Health Promotion Facility showed the same results. The service quality was improved by executing the activity for service quality improvement, and views on the staff's service were improved in the health promotion facility. In the light of the results of this study, objective measurement of the service quality is necessary in a health promotion facility. An activity for service quality improvement based on the objective findings is effective for health promotion facilities. Moreover, such efforts themselves may change the staff's way of thinking and lead to service improvement activity.

CONCLUSIONS

The results of this study revealed that objective measurement of the service quality was effective in a health promotion facility. An activity for service quality improvement based on the objective findings is effective for the facilities management.

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WORKPLACE VIOLENCE AND WORKERS' STRESS: THE CASE OF HOME CARE WORKERS IN ONTARIO, CANADA

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ABSTRACT

This study covers both physical and psychological workplace violence and examines the workplace violence experienced by workers in home care, and the association between violence at work and home care workers' stress. Based on our survey of 991 visiting home care workers in Southern Ontario, Canada, results show that 28 % were exposed to inappropriate racial/ethnic and 35 % were exposed to sexual comments or behaviour. About a quarter had ever been a victim of violence or threat of violence, with one in ten during the past year. Multivariate analyses show exposure to racial/ethnic or sexual comments or behaviour, and ever been a victim of violence are all significantly associated with increased levels of stress. We recommend employers to carefully assess clients and inform workers of any known or potentially violent clients. They should assign two workers to a client, if there is known violence, and the same procedure should be used for all new clients until workers report working alone as acceptable. This is a dangerous job and should be paid accordingly well. Workers should be given training to protect themselves from violence; should consider their own safety first and report violent clients to supervisors; and demand adequate compensation for that.

Key words: Home care workers, Workplace violence, Stress

INTRODUCTION

The health care sector has grown significantly in the last 25 years and it is one of the largest employing sectors in Canada. The sector is labour intensive despite the use of technology in providing care to clients. With ageing population in Canada and the trend of early hospital discharges in Ontario, there is a continuing need for home care services in the province and in Canada. Home care sector employs a large percentage of women and an ethnically diverse workforce particularly among the personal support workers. Our earlier research showed high levels of stress (Denton et al 2002, 2003) and musculoskeletal disorders among home care workers (Zeytinoglu et al 2000, 2009). Compared to the general population of women in paid employment in Canada, participants in our studies reported higher levels of physical health problems.

While the demand for workers is increasing in home care, there is little knowledge about the working conditions in the sector, particularly the health risks of home care work environment. This paper is important in contributing to the knowledge on violence experienced by workers in home care and the effect of violence at work on workers' health and wellness. The purposes of this paper are to examine the workplace violence experienced by workers in home care, and the associations between violence at work and home care workers' stress. We focus on both physical and psychological violence. For stress we study symptoms of stress and job stress. Data are from our survey of 991 visiting home care workers (visiting nurses, therapists and personal support workers) in

a medium-sized city in Southern Ontario, Canada. This paper builds on and extends our earlier work on work-related violence in home care and occupational health and safety of workers that was based on our 1996 data (Denton, Zeytinoglu and Webb 2000).

Definition
In the literature, the definition of violence varies from one study to another. The physical violence at the workplace has always been recognized and the psychological aspect of violence is increasingly being incorporated in the legislation and public policy forums (European Foundation 2010). The World Health Organization (Krug et al 2002) defines violence as 'the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation'. Canadian Centre for Occupational Health and Safety (CCOHS 2011) defines workplace violence as 'any act in which a person is abused, threatened, intimidated or assaulted in his or her employment'. In our study, workplace violence refers to both physical and psychological violence experienced by workers. Specifically we explore whether or not the worker has "been exposed to inappropriate racial/ethnic comments or behavior by clients or client family members; been exposed to sexual comments or behavior by clients or client family members; ever been a victim of violence or threat of violence at their workplace; and/or been a victim of violence at work during the past year". For our study the location of the workplace violence is the clients' home since workers perform the tasks of their jobs in a client's home and each work location, i.e. client's home is different from another.

THE LITERATURE ON WORK-RELATED VIOLENCE IN HEALTH CARE
There is accumulated research showing that health care workers are at a greater risk of experiencing work-related violence than workers in many other occupations (Chappell and DiMartino 2006, European Foundation 2010). Physical, emotional and sexual violence and sexual or racial harassment by clients or the clients' family members are common in home care work (Denton et al 2000). Frustration and anger arising out of illness and pain, older-age problems such as dementia are shown to affect clients' behaviour and make them physically and verbally violent. Inadequacies in the work environment where care activities are performed, insufficient training of staff, and general climate of insecurities in the workplace are all shown to be triggers of violence at the workplace (Chappell and DiMartino 2006).

Effect of violence on workers and their employers
Violence at work is shown to have serious implications for the health and wellness of workers and affect their workplaces. Research is well established in showing the effects of workplace violence on the physical, emotional and mental health of workers (Chappell and DiMartino 2006, European Foundation 2010, Schat et al 2006). Workers report stress, anxiety, burnout as well as injury due to violence at work. Death due to violence at work is not uncommon. Violence at work is also shown to negatively affect employers with increased absenteeism, loss of productivity, and turnover as consequences of violence (Chappell and DiMartino 2006, European Foundation 2010).

Risk factors
Several risk factors are identified in the literature for workplace violence: individual risk factors, workplace risk factors, contextual factors (such as globalization and restructuring) and societal risk factors (such as violent society, widespread injustice in the society) (Chappell and DiMartino 2006). In this study we focus on workplace risk

factors. Among the workplace risk factors, working with the public; handling drugs; working alone; providing service, care advice, or education; working with unstable and volatile persons; working in isolated areas; working with people with distress; having a mobile workplace; and working during periods of intense organizational change are significant risk factors for workplace violence to occur (CCOHS 2011, Chappell and DiMartino 2006). Home care workers are at risk from unsafe homes and neighbourhoods, and abusive and aggressive clients and families. Home care workers work alone, in the homes of their clients, and move from one home to another staying in each house for about an hour. They work in isolation away from their peers and supervisors. They may also lack information on their clients and do not always receive adequate information regarding potentially dangerous clients.

The conceptual model of workplace violence and stress
As it is presented in Figure 1, workplace factors of physical and psychological violence are the factors that are examined as associated with stress. We argue that the workplace violence factors will be positively associated with workers reporting symptoms of stress and job stress. The individual factors of occupation as personal support worker, nurse or therapist, tenure in the profession, gender, being a visible minority or not, and seeing oneself as a member of an ethnic minority are associated with violence at work and we include them as control variables. Mastery and organizational support is known to lower stress, and thus these workplace factors of organizational support (including the supervisor support) and peer support along with individual factor of mastery are included as control variables.

Figure 1. The conceptual model of the relationships between workplace violence and stress among home care workers.
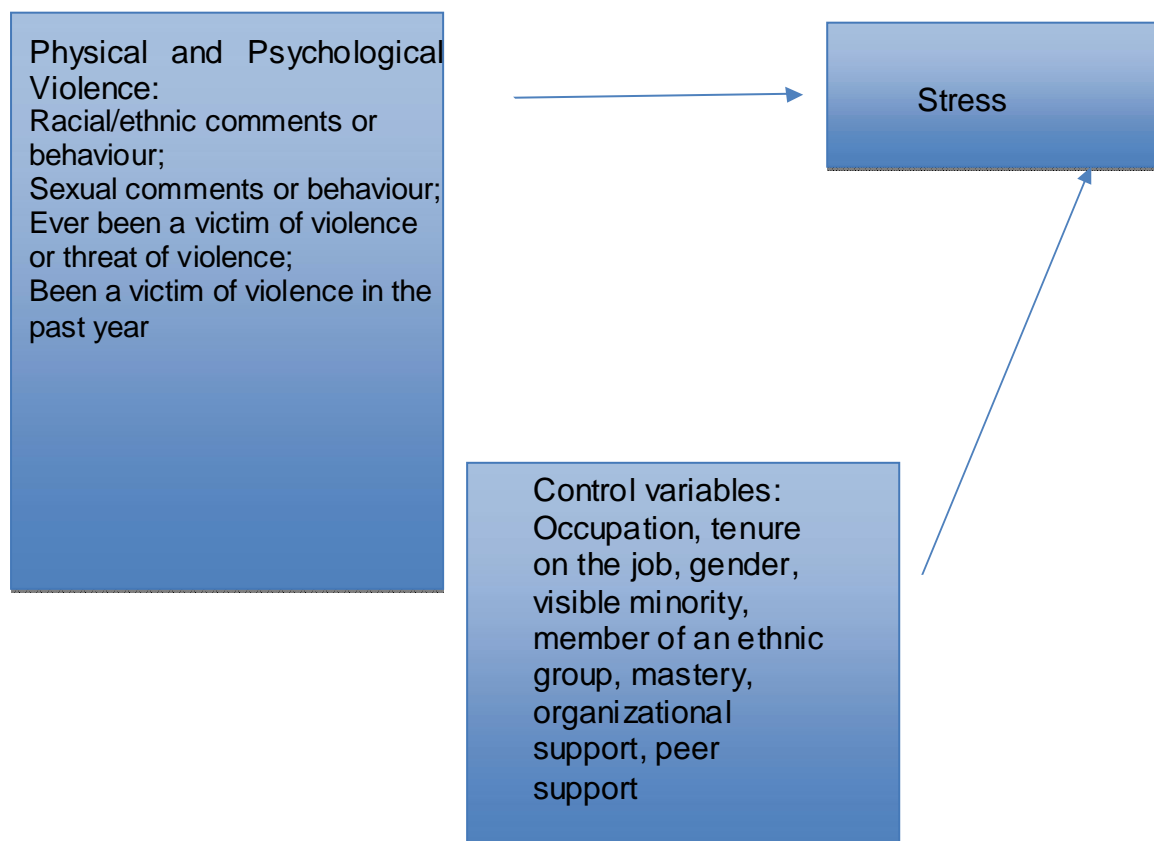
METHOD
SAMPLE AND DATA COLLECTION
Home care workers from a mid-sized city in Ontario were invited to participate in the study (N=1949). After receiving ethics approval from the University's research ethics board, data were collected using a self-administered questionnaire which was mailed to both visiting and office workers. Those that did not return their questionnaires by a specified date were first sent reminder cards followed by a second copy of the questionnaire. A total of 1311 home care workers responded to our study, resulting in a response rate of 67 %. The focus of this paper is on the 991 visiting home care workers selected from the respondents including visiting nurses, therapists and personal support workers (also called home support workers, home health care workers or personal assistance service workers). Research on office workers, are not included here since they have substantially different work environment and contracts.

INSTRUMENT AND MEASURES
A self-completion questionnaire on the health and work life of home care workers is used for this study. All scale items are coded on a 5-point scale with 1 indicating "none of the time" and 5 "all of the time". Confirmatory factor analysis is conducted on all scales and the scale reliability, i.e. Cronbach α, are presented in Table 2.
Dependent variable, job stress is a single-item question asking "would you describe your job as being 1=not at all stressful … 5=very stressful". Independent variables, violence variables, were developed based on our earlier qualitative and quantitative study (Denton et al 2000) along with questions adapted from Arnetz and Arnetz (2000). They were asked in the following order based on the prominence given to the issue in the qualitative component of this study (see Denton et al 2003): "have you been exposed to inappropriate racial/ethnic comments or behavior by clients or client family members?", "have you been exposed to sexual comments or behavior by clients or client family members?", "have you ever been a victim of violence or threat of violence at your workplace?", and for those who have ever been a victim of violence, "have you been a victim of violence at work during the past year?". They were coded as dummy variables (1=yes, 0=no). Control variables like occupations were coded as 1 (yes), 0 (no) for nurse, therapist or home support worker and therapist is the reference in the regression analysis. Seniority was measured as months in profession (codes as number of months), gender is coded as 1=female, 0=male, and member of visible minority and member of an ethnic group are each coded as 1=yes, 0=no. Mastery is a scale from the National Population Health Survey from Statistics Canada (1994), and organizational support and peer support are from Denton et al (2002) that are based on the questions used in the National Population Health Survey from Statistics Canada (1994). Mastery is measured by a seven-item mastery index (values as 7 to 35), organizational support scale is a 9-item scale (values as 9 to 45), and peer support scale is a 4-item scale (values as 4-20).

Analysis
Descriptive statistics, correlations and ordinary least square (OLS) regression methods are conducted. The regression analysis provides the means to achieve statistical control for confounding variables. The equal interval assumption is used for Likert scale measurement of the dependent variable. In the multivariate analysis, first the independent variables are entered into the regression analysis (Step 1). Next, control variables are included (Step 2). Adjusted R^2 is provided to show the variance explained by factors included in each model.

Demographic characteristics of the respondents

Of the 991 respondents in terms of occupational distribution, 672 are personal support workers, 235 are nurses, and 84 are therapists (see Table 1). The majority of home health care workers in this study were female (93 %), which is also a characteristic of the sector. Workers' ages range from 20 to 72 years, and the average age is 45 years. Most respondents are married or living with a partner (61 %), and the rest are widowed, divorced, separated or never married. A large proportion of the sample have a relatively high level of education: 20 % have post-graduate or bachelors' degree, 57 % have college diploma or certificate, and only 19 % have some college courses, high school diploma or lower. A large percentage of respondents are immigrants (43 %), a figure much higher than in the population of the city this study was conducted, and much higher than in the country as a whole (which is 16 % according to 2006 Census of Canada). Of the respondents, 13 % self-identify as a visible minority, and 32 % refer to themselves as a member of an ethnic group. The largest majority in this group are from the Philippines (27 %), followed by the U.K. (12 %) and Caribbean Islands (10 %). In general, home care workers have high levels of mastery, or a sense of control over their lives. Total average scores on mastery did not vary greatly by occupation.

Table 1. Descriptive statistics for variables used in the regression analysis (n=991; means, standard deviations and scale reliabilities (α)).

Variables	Mean (S.D.)	% (#)	α	N
Dependent variable:				
Job stress	2.93 (.91)		---	986
Independent variables:				
Been exposed to inappropriate racial/ethnic comments or behaviour by clients or client family members		28%	9	913
Exposed to sexual comments or behaviour by clients or client family members		35%		912 √
<u>Ever</u> been a victim of violence or threat of violence at your workplace		23%		924
Of those who said yes, been a victim of violence at work <u>during the past year</u>		49%		191
Control variables:				
Occupation:				
Nurse		24% (235)		
Therapist		9% (84)		
Personal Support Worker		68% (672)		
Seniority in the profession (number of months)	131.46 (110.45)			
Gender (1=female)		93%		991
Visible minority		13%		917
Member of an ethnic group		32%		942
Mastery	26.57 (4.64)		.80	991
Organizational support	33.43 (6.57)		.81	991
Peer support	13.93 (2.89)		.82	991

RESULTS

DESCRIPTIVE RESULTS

Results (in Table 1) show that home care workers have high levels of job stress. In terms of violence experienced, 28 % were exposed to inappropriate racial/ethnic comments or behaviour by clients or client family members. Of those who had such an experience 59 % were reassigned clients either because they asked or their supervisor reassigned them. Of our 991 respondents, 912 answered the question of being exposed to sexual comments or behaviour by clients or client family members and 35 % said yes, they had been exposed to sexual comments or behaviour by client or client family members. Fifty-six percent of these individuals were reassigned clients because they asked or their supervisor decided to reassign. Almost a quarter (23 %) of our respondents had ever been a victim of violence in the workplace, and as we present in Table 2, for those who had been a victim of violence, close to half (49 %) were victims of violence in the past year. The range of what they were a victim of varied but the vast majority were victims of verbal threats aggression, followed by pushing and scratching or pinching. About 20 % received physical injury though only 2 % took time away from work. Close to half (48 %) received help with the supervisor being the most helpful person. Details are provided in Table 2.

Table 2. Those who have been a victim of violence last year: detailed analysis.

Variables	Yes %	Total #
Have been the victim of in the past year (check all that applies):		
Verbal threats/aggression	83%	99
Spitting	14%	99
Biting	9%	99
Scratching or pinching	26%	99
Slapping or hitting	24%	99
Punching	9%	99
Pushing	29%	99
Kicking	14%	99
Restraining	5%	99
Sexual assault	5%	99
Road rage	12%	99
Sexual harassment	16%	99
Use of object or weapon	9%	99
Sustained any physical injury/injuries as the result of a violent incident in the past year	20%	97
Took sick leave due to violence	2%	96
Received help/support after the violence	48%	94
If they received help/support, who provided help/support: Supervisor Supervisor with co-worker or someone else Co-worker Someone outside the workplace	67% 13% 9% 11%	45

CORRELATIONS

The correlations between the dependent variable and four independent variables showed that they were positively and significantly correlated at p<.01 level for all variables, except having been a victim in the past year. This variable was only significantly and positively correlated with ever been victim of violence and that was at p<.05 level. Correlations between all variables are available from the first author.

REGRESSIONS

As we present in Table 4 and 5, workers been subject to inappropriate racial/ethnic comments or behaviour, and been exposed to inappropriate sexual comments and behaviour are positively and significantly associated with job stress. Ever been a victim of violence or threat of violence at the workplace is also positively and significantly associated with job stress, but for those who have ever been a victim of violence, whether the worker has been a victim of violence in the past year or not is not associated with job stress. These results are mirrored with job stress as well (tables available from the Authors). With all variables included, our models explain 10–11 % of the variance in job stress.

CONCLUSIONS

In this study we focused both on physical and psychological workplace violence. We examined the workplace violence experienced by workers in home care, and the association between violence at work and home care workers' stress. Based on our survey of 991 visiting home care workers in Southern Ontario, Canada, results show that 28 % were exposed to inappropriate racial/ethnic and 35 % were exposed to sexual comments or behaviour. About a quarter had ever been a victim of violence or threat of violence, with one in ten during the past year. Multivariate analyses show exposure to racial/ethnic or sexual comments or behaviour, and ever been a victim of violence are all significantly associated with increased levels of stress. Overall, this study confirms previous research that home care workers are at high risk of workplace violence.

RECOMMENDATIONS FOR PRACTITIONERS

There are costs for victims of experiencing violence at work. The violence towards workers does not only lead to physical health problems such as a physical injury, they can also lead to mental health problems (European Foundation 2010). Physical effects can be sleeping problems, changes in appetite, headaches, muscle tension, and nausea. Psychological effects can be depression, guilt, lost of confidence and anxiety. These can then affect employers through absenteeism reported by workers, and turnover (Denton et al 2000). Workers' compensation claims can increase the costs for the employers.

Table 3. Relationship between job stress and violence variables: Multivariate analysis results (Hierarchical OLS regressions).

Variables	Model 1, Step 1 B (S.E.)	Model 1, Step 2 B (S.E.)	Model 2, Step 1 B (S.E.)	Model 2, Step 2 B (S.E.)
Constant	2.887 (.037)***	4.439 (.343)***	2.840 (.039)***	4.408 (.342)***
Independent variables:				
Inappropriate racial/ethnic comments or behaviour	.252 (.070)***	.236 (.067)***	---	---
Inappropriate sexual comments or behaviour	---	---	.306 (.065)***	.260 (.063)***
Control variables:				
Occupation:				
Nurse	---	-.299 (.117)*	---	-.312 (.117)**
Therapist	---	reference	---	reference
Personal Support Worker	---	-.575 (.109)***	---	-.564 (.109)***
Seniority in the profession	---	.000 (.000)	---	.000 (.000)
Gender (1=female)	---	.128 (.119)	---	.133 (.118)
Visible minority	---	-.155 (.097)	---	-.113 (.098)
Member of an ethnic group	---	.089 (.067)	---	.112 (.067)
Mastery	---	-.029 (.007)***	---	-.029 (.007)***
Organizational support	---	-.015 (.005)**	---	-.016 (.005)**
Peer support	---	-.009 (.012)	---	-.009 (.012)
R^2	.02	.11	.03	.12
ΔR^2		.09		.09
Adjusted R^2	.01	.10	.03	.11
N=	833	833	832	832

*p<.05; **p<.01;   ***p<.001.

Table 4. Relationship between job stress and violence variables: Multivariate analysis results (Hierarchical OLS regressions).

Variables	Model 3, Step 1	Model 3, Step 2	Model 4, Step 1	Model 4, Step 2
	B (S.E.)	B (S.E.)	B (S.E.)	B (S.E.)
Constant	2.903 (.035)***	4,494 (.341)***	3.022 (.099)***	5.037 (.860)***
Independent variables:				
Ever been a victim of violence or threat	.242 (.077)**	.189 (.075)*	---	---
Victim in the past year	---	---	.208 (.141)	.125 (.139)
Control variables:				
Occupation:				
Nurse	---	-.353 (.118)**	---	-.529 (.270)
Therapist	---	reference	---	reference
Home Support Worker	---	-.621 (.109)***	---	-.640 (.268)*
Seniority in the profession	---	.000 (.000)	---	.000 (.001)
Gender (1=female)	---	.154 (.118)	---	.314 (.303)
Visible minority	---	-.127 (.098)	---	-.067 (.247)
Member of an ethnic group	---	-.105 (.067)	---	.204 (.162)
Mastery	---	-.030 (.007)***	---	-.037 (.015)*
Organizational support	---	-.017 (.005)**	---	-.029 (.011)*
Peer support	---	-.006 (.012)	---	-.017 (.025)
R^2	.01	.11	.01	.18
ΔR^2		.10		.17
Adjusted R^2	.01	.10	.01	.13
N=	840	840	177	177

*p<.05; **p<.01;   ***p<.001.

Dealing with workplace violence should involve both prevention and intervention. Setting up an alarm system, worker training on violence prevention and policies on violence, and flagging of clients (patients) who have histories of violence, are prevention strategies that can be used in home care settings. We recommend employers to carefully assess clients and inform workers of any known or potentially violent clients. Still home care workers face unique circumstances and thus, require unique intervention strategies. For example, cell phones that all visiting home care workers use for work can be connected to an alarm system for immediate action in case of an emergency. An escort system where workers are assigned in twos to known violent clients can be implemented; even security personnel might be provided to assist workers with known violent clients who need home care services. The same procedure can be used for all new clients until workers report working alone as acceptable. This is a dangerous job and should be paid accordingly well. While therapists are paid, in our view adequately, visiting nurses are paid much lower than their counterparts in hospitals

and eldercare institutions; and personal support workers earn barely above the minimum wage. We recommend workers to be paid adequately for the dangers in the job. This was done historically in other occupations such as mining and construction and it can also be used in home care. Workers should be given training to protect themselves from violence, should consider their own safety first and report violent clients to supervisors and demand adequate compensation for that.

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EVALUATING INTELLECTUAL CAPITAL IN THE CARE OF THE ELDERLY

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ABSTRACT
The significance of intellectual capital in the care of the elderly was the research object of the Jalmari Jylli foundation's three-year project. Here a self-evaluation tool for management was developed. The Project is funded by the Slot Machine Association. Other co-operation partners are NHG Audit Oy, Tampere University of Applied Sciences, Tampere University of Technology measurement team, Rehabilitation Centre Apila and the Helsinki Mission. The evaluation method is based on the frame of a holistic management system influenced by the ISO 9000 system, the EFQM frame, and BSC thinking. It can be implemented electronically and the results can be viewed separately in strategic and operative management and the main service processes. It is also possible to make comparisons with other actors. In 2010 the applicability of the evaluation was tested in 40 elderly care organizations. This article describes the background, preparation process, and the testing of the method. The method proved feasible. As it is based on international models, it can support existing management and quality performance systems. Further testing and development are to be a subject for future research.

Key words: Elderly care management, Intellectual capital, Evaluation, Qualitative performance ability

INTRODUCTION
The need for evaluation of intellectual capital in elderly care emerged from the development in which elderly care organizations are responsible for changes in their operating environments. The main change factors are ageing of the population and the retirement itself of workers in elderly care. In Finland, the population is currently ageing the fastest in Europe. It has been predicted that by year 2060 the share of the population over the age of 65 will double from the present 905,000 to 1.79 million. At the same time the work will be centralized in ever larger administrative and operative units (Parjanne 2004, Office of the Council of State 2004, Statistics Finland 2010).

Special expertise in the field of memory defects will play a significant role as the need for care increases. Six million Europeans are currently suffering from memory impairments and by 2040 their number is estimated to increase to 13 million. In Finland in 2007, the number of those with at least moderately severe memory impairments was 87,300 and this is predicted to increase by 2015 to more than 130,000. The trend will necessitate the development of service chains for those with memory defects, that expertise in the field is ensured, likewise the attractiveness of work in elderly care (Suhonen et al 2010, Statistics Finland 2010, Voutilainen 2008, STM 2008a,b).

At the same time, as it is difficult to recruit new personnel for elderly care, the condition of those in need of it is deteriorating and the need for efficiency is increasing. The

traditional job description of a worker in elderly care is changing and will come to include more information processing, decision-making and cooperation. The introduction of novel technological solutions will increase the independence and responsibility of the individual care worker (Dubois et al 2006, Hjerppe and Kangasharju 2003, Kanste 2005a, Lammintakanen and Kinnunen 2006, Parjanne 2004, Office of the Council of State 2004, Voutilainen 2004).

Taking the intellectual capital for elderly care into account in management may for its part solve problems with the availability of workforce and the attractiveness of the field. According to research findings, there is a connection between the intellectual capital of the work unit and good treatment outcomes and also with coping at work among other workers and continuing the work career. There is a connection between the image and reputation of work with the elderly and organizational performance and success. The doctoral dissertations of Kanste (2005a,b) and Voutilainen (2004) and Syvänen (2003) among others have addressed work well-being and mechanisms pertaining to its significance. Traditionally, the personnel has long been deemed an important resource in elderly care, but the object of scrutiny should also be the reconnaissance of all the intellectual capital with a bearing on elderly care; how it has been exploited and how its management and exploitation should be further developed (Dubois et al 2006).

The systematic examination of the meaning of intellectual capital demands, as background for the preparation of development plans, both co-operation on the societal level among the private, public and third sectors, and also the optimization of interadministrative co-operation. This article describes the process of creating an evaluation method for a demonstration, research and development project of the Jalmari Jylli Foundation, its testing and findings. The co-operation partners of the Jalmari Jylli Foundation in this development project funded by the Finnish Slot Machine Association were NHG Audit Oy Ltd, Tampere University of Applied Sciences measurement team, Rehabilitation Centre Apila and the Helsinki Mission. The evaluation method was adopted in 2010 in an evaluation experiment at national level by 40 elderly care organizations.

The evaluation experiment revealed that the evaluation method developed in the project is appropriate for the self-evaluation of units in elderly care. The special strengths of intellectual capital and qualitative performance in elderly care organizations emerged in defining the basic task and values, in practices for the introduction of new workers, in well-being assessments and in the defining of client's objectives pertaining to service processes. On the other hand, the areas requiring development could be perceived as the systematic reconnaissance of client needs and stakeholder satisfaction, communications with stakeholders, utilization of evaluation information gathered from service processes, and the daily implementation of multi-professional co-operation. Regarding the implementation of voluntary work, the strength identified was the coordinators of volunteer workers and functions, while the area requiring development was the utilization of social media in the organization of volunteer work.

METHOD FOR EVALUATING INTELLECTUAL CAPITAL IN ELDERLY CARE

INTELLECTUAL CAPITAL IN ELDERLY CARE

Intellectual capital refers to all the resources of an organization which are not physical or financial. The synonymous term intellectual resources may also be used. It creates value in the organization and is totally or partially within its control, but not always

owned by the organization. It is a characteristic of intellectual capital that it does not wear out nor does its value depreciate in use. It is not linked to time or place. It also entails more uncertainty factors than does material property. Non-material matters can likewise be neither bought nor sold (Roos et al 2006).

Intellectual capital can be divided into three main categories, namely human, relational and structural. Human intellectual capital includes matters pertaining to people, such as know-how, attitude and commitment. The organization can never comprehensively control human capital. Relational capital is deemed to include factors pertaining to the organization's various stakeholders, such as reputation and customer confidence. Structural capital includes matters pertaining to the structure and culture of the organization, such as meeting practices. The three main categories are presented in Table 1. Of these, structural capital is slow to change and it takes shape over years of development.

According to Lönnqvist et al (2010), intellectual capital does not as an existing resource yield value on its own. It becomes productive of value when the resources emerge as functioning practices and, for example, know-how is comprehensively utilized in the organization in such a way that it generates quality in its operations. The entirety of intellectual capital can moreover be contemplated from numerous perspectives when the information yielded by different perspectives complements the image of the organization's level of capital. Potential perspectives include process, organization, client and personnel. Literature and research findings permit the conclusion that elderly care abounds in both tacit and explicit knowledge, and several resources of intellectual capital are significant for their functioning (Lönnqvist et al 2010, Sillanpää et al 2010).

Table 1. Perspective of qualitative performance and main intellectual capital resources in elderly care.

INTELLECTUAL CAPITAL		
HUMAN CAPITAL caring know-how professional interaction attitude tacit and explicit knowledge training	**STRUCTURAL CAPITAL** values and culture of care unit atmosphere at work service processes and systems of care documented information	**RELATIONAL CAPITAL** carers' relations to clients collegial relations relations to stakeholders co-operation agreements

The manifestation of intellectual resources in elderly care can be called qualitative performance ability. It entails a good resource level of intellectual capital and also that these resources are exploited comprehensively on every organizational level. Taking account of elderly care intellectual capital in management and in reviewing productivity, however, has so far been uncommon. Lahtinen and Laine (2003) among others have noted that, alongside conventional productivity, new measures ought to be developed. In addition to the paucity of existing research knowledge, a challenge to evaluation and measuring is the lack of readymade methods and tools. Moreover, it is difficult with traditional methods to standardize, on either the client or the personnel side, the human activity which is the object of measurement. Contemplated from the perspective of intellectual capital, however, it is possible to evaluate elderly care services and the performance ability of service units by emphasizing the personnel and the related

perspective such as the significance of know-how as an efficiency factor on both the individual and community level (Lahtinen and Laine 2003, Lönnqvist et al 2005, Syvänen 2003).

Davenport and Harris (2007) researched the significance of the analytic approach and the measurement and evaluation methods used by organizations. They hoped that, as the means of measurement and evaluation developed, organizations would also begin to report the state of intellectual capital alongside material capital, when the analytics of intellectual capital would be a natural focus for further development. Thus the significance of its management as an entity yielding added value would be acknowledged and visible. It is a precondition of successful reporting that the methods developed are implemented as part of the present scorecard and quality systems (Davenport and Harris 2007).

HOLISTIC EVALUATION OF INTELLECTUAL CAPITAL

In the Apo.työkalutika 1.0 evaluation method the intellectual capital of elderly care is evaluated in the frame of reference of the holistic management system. Here the organization's strategic, operative and processual levels are combined in the EFQM and ISO 9000 frames of reference mindful of the angle of inspection of a balanced management system. With these internationally common frames of reference, the structure of the evaluation method can be implemented in numerous elderly care organizations with the existing operating and management systems.

The evaluation method is the self-evaluation of organizational management. The evaluation entity contains, in a series of statements describing the organization's functioning state, both the intellectual capital resources and their manifestations in the organization. The areas for evaluation are strategic and operative management and scrutiny of the service process level. The evaluation further includes planning, implementation evaluation and development cycles in all these areas. The frame of reference and connecting the structure to the operative success of the organization are summarized in Table 2.

The evaluation statements have been rendered concrete for the operating level of the elderly care organization in such a way that it is possible for the organization management to identify matters in their own community. The evaluation takes a stand on the significance of each matter contained in the statement and the present situation. By responding to these, the management of the organization can create a picture of the experienced significance of its intellectual capital and of the present state of things holistically throughout the organization in a form that compares fields of operation. The concrete result at organizational level is the weighted averages of the series of statements describing intellectual capital for their significance in each organization.

Table 2. Operating principle of the evaluation method at different organizational levels.

STRATEGIC	OPERATIVE MANAGEMENT	SERVICE
Planning, implementation, development and evaluation on all levels		
SERIES OF STATEMENTS ON OPERATIONAL LEVEL		
Dimensions of self-evaluation of the statements: Significance and present state		

The structure of the evaluation model and the analysis of the series of statements support the interpretation of the results with the help of the underlying more extensive holistic management frame of reference (Figure 1).

Figure 1. Apo.työkaluptika 1.0 frame of reference, holistic management system (Lehtonen 2004).

Summary of the background of the evaluation experiments and research problems
As an outcome of the project, an evaluation and management self-evaluation were developed with which to examine the strategic and operative management of elderly care and service process matters in a form appropriate to existing quality and management systems. The basic objectives of the evaluation method were applicability, functionality and cost-effectiveness. The purpose of the evaluation experiment was to respond to the following research questions:

1. Has a feasible self-evaluation method been developed for elderly care management?
2. Which development areas will emerge in the test of the organizations' estimated intellectual capital?
3. Which strengths will emerge in the test of the organizations' intellectual capital?

IMPLEMENTATION OF THE EVALUATION EXPERIMENT

FORMULATION OF EVALUATION STATEMENTS
The frame of reference for the statements of the evaluation method took shape on the basis of international management system frameworks and models, relevant literature and research and also the experiences of experts. The statements were compiled around five thematic areas. These were strategic and operative management supporting a holistic management system in practical work and the most typical processes for the field of operations on the level of service processes, living in sheltered accommodation, rehabilitation and voluntary work.

The statements were validated in spring 2010 over a period of three months with pre-testing, a questionnaire on experience of use, and expert evaluations. The management of seven elderly care organizations participated in the pretesting. Next, experts evaluated the experiences of use obtained and the final 40 statements used in the trial evaluation. Comments were received from project actors, managers in elderly care

organizations and experts in the field of elderly care. The comments were gathered through telephone interviews and the electronic questionnaire forming part of the experiment.

The collections of statements pertaining to each area of evaluation were formed on the PDCA[1] principle (Plan, Do, Check, Act), which has traditionally been used in quality management and process development. In Deming's quality cycle thinking[2], development is conceived of as continuous learning and consecutive circles when after each round the goal is closer. The model accepts the notion that information develops in stages and after each round the ultimate objective can be adjusted.

Sample and progress of the experimental process

The evaluation experiment was implemented using the electronic ZEF evaluation engine (registered trademark). This is an Internet-based tool for feedback collection and management. With the help of the selected tool it was possible to implement the evaluation experiment in such a way that the present state and significance of the statement could be assessed simultaneously with a tertile matrix, one axis of which was used to describe the significance of the statement and the other its present state.

The Apo.työkaluptika 1.0 evaluation experiment was implemented by the management of the organization by estimating the statements grouped under strategic and operative management and the three service processes. The evaluations took a stand on the content of the statements pertaining to these areas regarding significance and present state. Each statement was evaluated separately. All organizations were required to respond to the areas of strategic and operative management and by choice to at least one process. The evaluation period used was twelve months back from the time of responding. Respondents were later also sent a short questionnaire on experience of use in order to collect feedback on both the applicability and functionality of the evaluation experiment and the tool used.

A total of 40 units participated in the evaluation experiment. The person responsible in each of these was sent separately an individual link to each evaluation theme. Through the links of the individual units it was possible both to monitor the response activity of each unit and to send remainders to non-respondents. Response time was two weeks.

Together with the evaluation experiment links, the evaluators were sent separate instructions for completing the evaluation which complemented the instructions with the ZEF evaluation engine. The evaluators were also given an opportunity to consult the party responsible for the implementation of the evaluation either by telephone or electronic mail. Over the two-week period the evaluators needed advice on using the evaluation scale in practice. The implementation of the evaluation lasted from two weeks to one month and during that time they received a reminder by electronic mail. They were also contacted personally by telephone.

After responding the respondents were sent a questionnaire on their experiences of use in order to collect feedback on the statements, the usability of the method and expectations related to the evaluation. The respondents were also offered an opportunity to give feedback in their own words. According to the experiences of use obtained, the apo.työkaluptika 1.0 self-evaluation practice enabled actors to stop to think about the present state of the organization and to identify development areas and

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[2] The PDCA quality circle was originally developed by Sheward in 1939. It was further developed by W Edward Deming in the 1950s. It was originally called the Sheward Cycle. The quality cycle concept has since been further developed by numerous researchers.

strengths emerging widely in their activities. The evaluation caused the evaluators to wake up to matters possibly neglected and also to consider how to react to these. Through the evaluation the evaluators expected to find benchmark partnerships throughout the entire field of operations on the basis of which they would be able to compare their own activities to those of other organizations. Experiences of use played a significant role when the evaluation experiment was further developed in an appropriate manner.

SUMMARY OF FINDINGS

In the processing of the responses the aim was both to identify the strengths and weaknesses of the organizations evaluated and to compare them against one another. It was of the essence to present the findings concisely but in sufficient detail so as to be comprehensible. The findings were contemplated both by subfield and statement by statement. Thirty-seven participants responded to the subfields of strategic and operative management, 23 to the subfield of sheltered accommodation, 15 to the subfield of rehabilitation and 16 to the subfield of volunteer work. Due to the low response rate there was a great deal of distribution in the subfields of rehabilitation and volunteer work.

In each subfield in the evaluation the statement groups were formed on the basis of the continuous development Plan – Do – Check – Act (PDCA), which is traditionally used in quality management and processual development. Considering all the statements in the subfields we can on average be more satisfied with the planning and at least satisfied with development, the differences, however, being very small.

In the examination of the subfields their present states were calculated as weighted averages of the present states of the statements using the meanings attached as weights. The findings were introduced to the participants using the present states reported by the participants together with the averages of the present states of all participants as comparison values. For each participant and comparison value the meanings attached by the participants were used as weights. Thus the method adapted to the participant's view of the content of intellectual capital.

Figure 2 presents the average current states of the subfields. They were calculated as weighted averages for the averages of the statements using as weights the average values of the meanings of the statements. The sample showed no greater average differences in the present states of the intellectual capital of strategic management, operative management and processes. In the sample, the intellectual capital pertaining to evaluation and development was in a poorer state than that related to planning and implementation.

Figure 2. Average current states of subfields in planning, implementation and development calculated from the average current states using the average meanings as weighted averages.
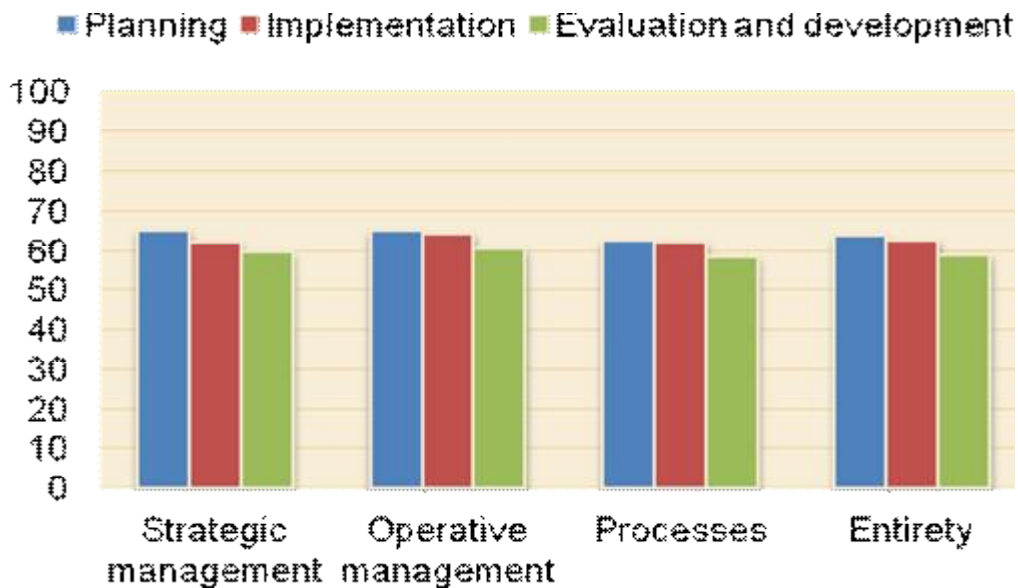
Figure 3 presents the current states and meanings and average values of meanings by statements and the 95 per cent confidence intervals of the averages. It appears from the findings that the strengths were found in defining the basic task and recording and also defining organizational values and recording. Areas for development included, among others, the systematic assessment of potential clients' needs, regular analysis of strategic findings and research projects, and the systematic collection of researched knowledge. The most meaningful statements were found to be the clear communication of the basic tasks to personnel, client, relatives and interest groups. However, its present state was on a mediocre level.

Figure 3.   Average current states and meanings of strategic management statements and their 95 per cent confidence intervals.
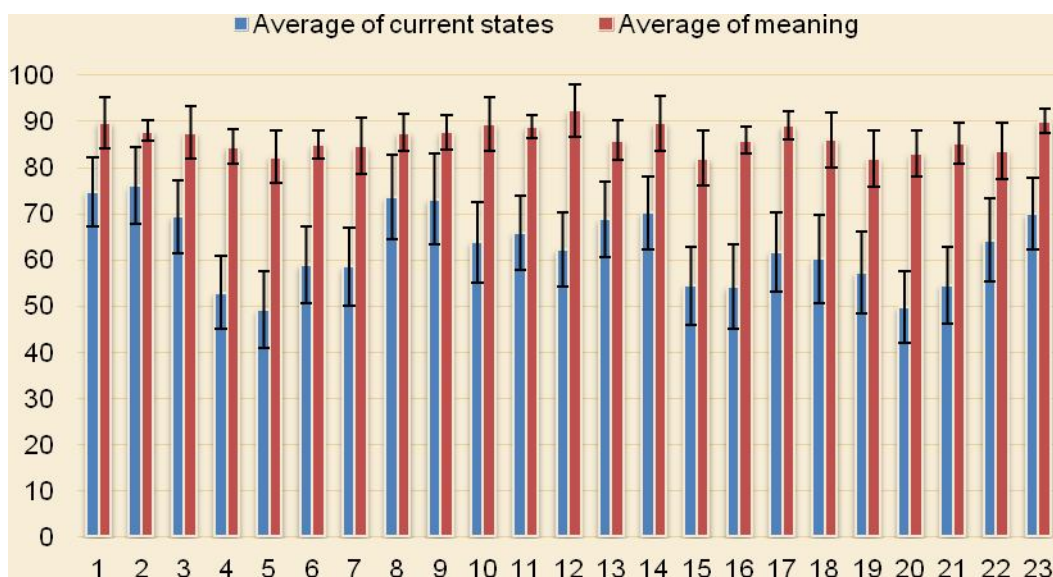
1	Defining and recording the basic task	13	Maintaining value discussion in the organization
2	Defining organizational values and recording them	14	Taking note of the basic task and values in decisions
3	Taking account of values of elderly person's quality recommendation	15	Systematic implementation of the action model in follow-up and analysis of the operating environment
4	Systematic utilization of researched information in the planning of operations	16	Systematic need assessment for those ordering services
5	Systematic reconnaissance of potential clients' needs	17	Maintaining regular contact with main identified stakeholder groups
6	Basic service design in the analysis of the operating environment	18	Evaluation of strategic management of at east one of the following: self-evaluation, internal of external audit.
7	Basic service design for forecasts	19	Evaluation of achievement of objectives of development themes.
8	Strategic objectives based on basic task and values	20	Regular analysis of evaluation information of strategic findings and development projects
9	Written strategic goals	21	Utilization of above mentioned evaluation information in the direction of operations
10	Selection of development themes on the basis of strategic outlines	22	Implementation of values in at least one of the following: self-evaluation, internal of external audit
11	Action plan geared to the implementation of strategic objectives	23	Implementation of the basic task in at least one of the following: self-evaluation, internal of external audit
12	Clear communication of the basic task to the personnel, clients, relatives and stakeholders		

In a comparable examination, the strengths in operative management were found to be the agreed mode of action and content of introduction of new colleagues, as well as regular assessment of personnel well-being. These were also felt to be the most meaningful statements. Areas for development were regular satisfaction assessment of stakeholder groups, defined and recorded communications policy and agreed mode of action and content for informing other interest groups.

In the processes of living in sheltered accommodation the strengths were found in drawing up a service plan for all residents and taking note of individual needs in the service plan. Areas for development were perceived, among other things, in the utilization of the evaluation information gathered. The level of implementation of operating on the principle of multidisciplinary teams seven days a week was poor but it was deemed the least meaningful statement, as the seven-days-a week principle was deemed unnecessary. In rehabilitation, the strengths were ascertaining the client's initial situation with agreed assessment methods and setting objectives for the rehabilitation process together with the client and his/her representative. In rehabilitation the area requiring development was found to be the usefulness of the systematic client feedback system of the rehabilitation system, which was also deemed the least meaningful statement. In volunteer work it was deemed a strength that (a) named coordinator(s) was/were responsible for volunteer workers and operations and the development area was utilizing the means of social media in the organization of voluntary work.

In summary, one can contemplate the benefits of the method for evaluating intellectual capital on the level of society, organization and individual. On the individual level, the benefits are the identification of matters pertaining to know-how and support for one's own further development. On the organizational level, the benefits are support for management, identification of matters pertaining to intellectual capital and qualitative performance capability and, in this connection, the definition of areas for further development. In the long term, the findings can be compared to those of one's own and other fields of operation. Through evaluation an individual organization can communicate visible matters pertaining to intellectual capital to both clients and interest groups. On the societal level, the useful aspects are in raising the profile of elderly care and giving prominence to the expertise that it demands.

DISCUSSION AND CONCLUSIONS

According to the evaluation experiment, actors in the field have a sound basis for development work. The findings confirm the conception at the level of strategic management that producers of elderly services in the third sector both define and record values and operating principles, and these are mostly taken into consideration in decision-making. Values constitute the basis for strategic work, and with their help operations can be directed, which is the aim in development work (Karlöf and Lövinsson 2004). Strategic development projects based on values and operating principles and regular evaluation of information on the findings achieved continues to be a challenge.

The evaluation experiment showed that not enough effort is so far being invested in assessing and analysing the needs of potential clients and the operating environment. In this connection, a challenge for the operative management is also the systematic reconnaissance of customer-client satisfaction, which should have an effect on development projects related to strategy work.

The intellectual capital of units for elderly care includes, among other things, the expertise of the personnel, know-how, and the dissemination of precise and tacit knowledge. These determine how the organizations select modes of operation to achieve their objectives and how well they are able to adapt to changes (Ahonen 2006, Dubois et al 2006, Kinnunen 2006, Lumijärvi 2006). The findings suggest that in the field of operative management, personnel resourcing and rules of play for maintaining the work atmosphere are deemed significant success factors from the perspective of the organization. In this field, the strengths emerging were agreed to be modes of action and content in the introduction of personnel and in assessing well-being. The evaluation did not make a distinction between introducing permanent and temporary personnel – the systematic introduction of substitutes and new personnel is an important future prospect. The findings in the operative area show that the reconnaissance of personnel's expertise combined with development discussions is not done comprehensively enough so as to serve as a basis for a training programme corresponding to the needs of the organization.

From the areas of service processes in the evaluation experiment it emerges that the service plan (legislation on the position and rights of the client in social care 22.9.2000/812, 7 §) is by and large made according to the evaluation for all clients, taking into account their individual needs (Päivärinta and Haverinen 2008). The findings show that exceptions are well identified in the work organization and methods to remedy these are in place, which is also one of the principles for safe medication. In the rehabilitation process particularly, the evaluation of usefulness from the client's side emerged as a significant area for further development. It is advisable to draw up documented modes of procedure for the collection of client feedback and reporting.

Measuring and evaluating operations is characteristic of the successful organization. Prior to development information is needed on the organization's present state. The evaluation of intellectual capital can be accomplished as self-evaluation, as comparison development (benchmarking) and as external evaluation on the basis of various criteria. Subjective methods have traditionally been considered unreliable as they do not yield unambiguous figures and in self-evaluation particularly the evaluator him/herself forms a conception of the state of the matters to be evaluated. Subjective measures, however, are considered to be useable in complex and multidimensional phenomena. The cost-

effectiveness of their implementation also speaks in favour of subjective methods (Lönnqvist 2010).

On the basis of experiences of use, the evaluation of intellectual capital was considered topical in the trial organization. It was also considered to open up new perspectives as a means for targeting development actions. The evaluation was felt to have been extensive and multidimensional. Due in part to the repetition of the PDCA chain (plan, do, check, act) some of the testees experienced repetition in different evaluation areas. The experiences of use played an important role in the further development of the method.

The findings permit the conclusion that the evaluation method can be considered useable in the self-evaluation of the elderly care organization, and this also serves as a tool for strategy work and management. The findings revealed both strengths and areas for development by which the management of intellectual capital could be taken better into account in elderly care. Self-evaluation is not only a separate measure; due to its frame of reference it can serve as a firm part of the organization's existing quality and operation systems in which it supports planning, development and reporting to interest groups. From the perspective of quality management, the evaluation method can be used as support for both internal and external audits. The challenge in the development of the evaluation method is to check reliability more precisely by extending the evaluation sample. A subject for future research is to extend the evaluation method to apply to the entire personnel, for example from the perspectives of processes and expertise in interaction.

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BROADENING THE TARGET GROUP FOR HIGHER EDUCATION IN GERMANY: A CASE STUDY ON DIVERSITY MANAGEMENT

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ABSTRACT

In some industrialized German areas, as in the Ruhr-Area, the percentage of students with migrant background in primary education has overcome the 50 percentage limit with an increasing share in future, the overwhelming part of them with family from Turkey. A large share of those students attains the admission qualification to higher education from "Berufskollegs", schools which focus on the combination of vocational skills and theoretical education. This migrant potential can primarily be tapped for additional students by universities of applied sciences which are embedded into their regions and dedicated to teaching. First, we show the approach to conceptualize culture and cultural specifics of migrants with Turkish background this project is based on. Second, we give an overview on the main actions of the project, systematically presented as a process leading students through the institution ("input, throughput, output"). Third, we frame the project by referring to principles of diversity management in general.

Key words: Demographic change, Diversity, Intercultural classroom

INTRODUCTION

As many countries all over the world, Germany is subdued to significant demographic change (see BMI 2009), thereby reducing traditional target groups of potential students and opening new ones in parallel. Based on this process, migrant students come in focus: In some industrialized areas, as in the Ruhr-Area, the percentage of students with migrant background in primary education has exceeded the 50 percent limit with an increasing share in future, the overwhelming part of them with family from Turkey. A large share of those students attains the admission qualification to higher education from "Berufskollegs", schools which focus on the combination of vocational skills and theoretical education. This migrant potential can primarily be tapped for additional students by universities of applied sciences which are embedded into their regions and dedicated to teaching.

In this paper, we present the activities of such an institution of higher education focusing on the potential of migrant students, situated in the Ruhr-Area. We conceptualize the program to be analysed as an initiative of diversity management with focus on intercultural processes. Of course, culture is just one dimension of diversity among others (gender, class, ethnicity, as a central triad in modern societies)[3]. Those aspects will be considered when analyzing the situation and developing actions to build a holistic concept.

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[3] As an holistic approach our case should be analyzed referring to the concept of "intersectionality" (see Buehrmann 2009)

Therefore, we shall first show the approach to conceptualize culture and cultural specifics of migrants with Turkish background this project is based on. Secondly, we shall give an overview on the main actions of the project, systematically presented as a process leading students through the institution ("input, throughput, output"). Third, we shall frame the project by referring to principles of diversity management in general.

REFLECTING ON THE SITUATION OF MIGRANT STUDENTS

Today's situation of migrant students in Germany is characterized by certain challenges[4]. More than 40 percent of the students with migrant background stem from families of lower social level. Therefore, we have to consider the specific effects of class on chances of educational success as well. The most recently published Shell Study shows again the extreme importance of family educational background in Germany (Shell 2010). Thus we have to face the fact that those potential students will show a certain profile, being shaped during primary and secondary school education before entering university or vocational education. Direct effects of migrant family background are interwoven into this profile. In detail the following aspects have to be taken into account:

- Semilinguism in both languages (German and parents' mother-tongue) is widespread and often connected with lower skills in maths. Even students with good speaking skills in both languages might be close to illiterate concerning writing skills in Turkish and might still lack skills in writing German.

- Many students have to finance studies by working long hours in a job and are therefore characterized as "part-time-students". This delays the graduation or results in interruption or even break up of studies, which is comparatively common in this group. An aggravating fact might be that students from lower classes tend to be more pessimistic concerning their future chances and less content with their life.

- The realization of international internships or study terms abroad is below average. Nevertheless, the reasons not to go are similar to all students with financial aspects dominating. The Arabic cluster countries are preferred above average by all students.

- Discrimination on the labour market even for high performers can be observed.

- Role models related to academic careers are lacking in family. This again is an effect of the specific combination of the target group's class and culture, mirroring the general societal situation: Migrant managers are still extremely rare on higher levels in German firms, to many of whom "diversity" is a "foreign" word to this day. This holds to an even stronger extent for female migrant managers.

- Additional and/or special consultancy is needed and consultants with a similar migrant background are preferred.

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[4] See Aktionsrat Bildung (edts.), 2007; Autorengruppe Bildungsberichterstattung, 2008; BMBF (edt.), 2007; Bundesamt für Migration und Flüchtlinge (edt.), 2009; Kirsten, Reimer & Kogan, 2008; Liebig & Widmaier, 2009, The Boston Consulting Group (edt.), 2009, Shell Studie, 2010. Concerning some specific results we refer to an explorative study of migrant students in a German university (see Wolf 2011).

CULTURE CLASH AS ONE FACET OF MIGRANT STUDENTS' SITUATION
Empirical research and practical experiences from German universities show specific patterns of migrant students' study behaviour and study success. Those challenges might be connected to specific cultural characteristics shaping German institutions of higher education on the one hand, and to the group of migrant students, on the other hand. Differences between those might lead to a culture clash with negative results for the group with a minority status. Consequently, it is indispensable to analyse the underlying cultures including the connected power relations.

When doing this, it is critical to choose a suitable approach: In one possible approach culture can be interpreted as relatively homogeneous and stable, even over generations. In this case, Turkish and German cultures are both objects of analysis and their characteristics have to be compared critically. This approach will be discussed in greater detail below, using empirical material from a recent study.[5] An alternative or at least additional approach understands culture as rather in-homogeneous, fluid,"hybrid". This approach seems to be of high importance concerning migrant cultures as we will highlight later on.

COMPARISON OF CULTURAL SPECIFICS
Using the results of the GLOBE project[3], we can identify relevant differences (different bands) between Western Germany and Turkey cultures[4] concerning the following dimensions (for details see Table 1 in Addendum):

- Practice:
    - Uncertainty avoidance
    - Future orientation
    - Collectivism II (In-group)
    - Humane orientation
    - Collectivism I (Institutional)

- Values:
    - Future orientation
    - Performance orientation
    - Uncertainty avoidance
    - Gender egalitarianism
    - Collectivism I (Institutional)
    - Collectivism II (In-group)

Comparing culture to an ice-berg, visible (including body language) and audible phenomena are just superficial parts of the challenge. Much more important are unwritten rules, values, stereotypes and taboos. The background to this is the fact that

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[5]Recently, the GLOBE project group presented a comprehensive empirical study of 62 societies worldwide asking for values and practices on the societal and organizational level (see House et al 2004). The definition used in this project is as rather differentiated"..., culture is defined as *shared motives, values, beliefs, identities, and interpretations or meanings of significant events that result from common experiences of members of collectives that are transmitted across generations.*" (House and Javidan 2004)

cultures develop specific and dynamic cultural standards which strongly influence the perception, attitude and behaviour of individuals (Thomas 1993).[6]

> "Cultural standards mean all sorts of perception, thinking, evaluating, and action, which the majority of the members of a specific culture accept personally and for others as normal, typical, and binding.
> Own and foreign behaviour is evaluated and regulated on base of these cultural standards." (Thomas 1993:381, translated by Hansen)

In case of Turkey eight cultural standards, still in use today, have been identified by Appl, Koytek and Schmid (2007):

- *Namus* (honour) and *seref* (reputation)
- Humane orientation (readiness to help others, hospitality)
- Relationship orientation / collectivism
- Orientation on hierarchy / power distance
- Relaxed attitude towards time and rules
- Indirect communication
- Service orientation and bargaining

Some of those cultural standards from Turkey can be characterized as completely diametrical to important German ones (see Schroll-Machl 2003), such as:

- Dominance of tasks
- Valuing of structure and rules
- Internalized control mechanisms, identification with task
- Very strict time management
- Strict separation of work and private life, family/friends – colleagues – acquaintances - strangers
- Direct communication
- Individualism

Concerning collaboration among "Germans" and "Turkish Germans", the interplay of the cultural standards described above has to be taken into consideration. If conflicting cultural standards are involved in such encounters, misunderstanding, conflicts, and stress will emerge. To avoid these, intercultural understanding is required. Rimmington, Alagic and Gibson use the metaphor of an un-visible cage whose bars must be "painted" to become visible and make people conscious of the bars' existence and the impact they have on communication (2006). Such intercultural understanding enables individuals to correctly interpret signals and behaviours of the "other" according to his or her cultural standards. Intercultural competent actors reflect their own system of orientation and develop appropriate answers which are not reduced to mere adaptation but generate culture-isomorphic explanations of the situation with prognostic qualities for future problems (Thomas 2006).

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[6]Different to the approaches described above, which are based on general cultural dimensions, the cultural standard concept is based on the premise, that those standards are culture specific and related to situational characteristics. Therefore the focus is rather on the improvement of intercultural encounters than on cross-cultural comparison.

ANALYSING MIGRANT CULTURE AS HYBRID

1. Migrant workers do not represent the "average" Turk but stem mostly from rural Anatolia, up to 30 percent from Kurdish families (Statistisches Bundesamt 2010: 60). We cannot be sure their specific societal practices and values are mirrored by GLOBE results but should rather be sceptical concerning this.
2. Nevertheless, we have to be careful to use nation as a proxy for culture in the case of migrants. Three arguments have to be taken into consideration:
3. During up to three generations migrants have been in contact with German culture to some extent. Therefore a process of "hybridization" (see below) might have shaped their culture and turned it from "Turkish" to "Turkish-German".
4. An opposite development is possible as well: as a minority in German society, Turkish and Kurdish families might have lived in conclaves, forming in-groups without strong contact to modern Turkey and/or Germany and thereby cultivating specific own patterns which might have separated their characteristics from those of both nations. In Germany certain groups of people with a Turkish background are to some extent practicing an orthodox lifestyle which is strongly separated from the majority's lifestyle. Some of those orders and associations are very active, e.g. in running summer schools and gaining increasing membership and influence (Kandel, 2005), thereby creating an even more diverse culture among the migrants with Turkish background.

Therefore, the GLOBE approach as well as the research on cultural standards can give us some cues but has its risks when used in the project presented here. More appropriate can be an even more differentiated and fluid concept. Consequently, we propose refraining from conceptualizing culture as related to whole nations and as being stable.

Instead, we follow a new stream of researchers who suggest that intercultural contacts and communication make "hybrid cultures" emerge:

> "Unlike multiculturalism, the concept of hybridization says that cultures are not given or fixed, but are constructs of history and discourse. That is, cultures are shaped and reshaped through interactions with other cultures in which people reflectively or unreflectively insert new meanings into their own (already hybrid) cultural understandings (…)." (Shimoni/Bergmann 2006: 78)

Intercultural communication with the result of hybridization takes place as a permanent process in a globalized world of teaching and learning, thereby not deleting borders between cultures but rather redefining them (in our case the borders of "pure" German and "pure" Turkish culture). Therefore, we have to take care how this ongoing discourse is performed and must analyse potential problems. Intercultural communication is the source of misunderstandings as well as a potential well of learning and enrichment, of sharing ideas and points of views and of combining them to reach new horizons of insight into culture, such as dealing with "messy issues" (Skenkar, Luo and Yehesekel 2008: 910). Therefore, the cited authors propose exchanging the metaphor of cultural "distance" into the metaphor of "friction". Their concept of friction addresses power and hierarchy as part of the intercultural encounter and opens the view to the processes of creating and re-creating of cultures (Shenkar,

Luo and Yehesekel 2008). In our case, migrant students can be supposed to create such a new culture, shaped by German and Turkish elements as well as by an emerging transnational culture of the educational system (Manikutty, Anuradha and Hansen 2007).

Culture, and that holds as well for hybrid culture, is seen as a system of orientation which contains single cultural elements being related and building a system which itself is embedded in "subnational and supranational metacultures" (Mathur and Joutsimäki 2006). The significance and content of the cultural elements are supposed to show differences as well as similarities in and between societal cultures. Interculturality can then be interpreted as interaction between individuals from different collectives who experience "strangeness" and face the challenge to develop normality and cohesion (Rathje 2006). As Juch, Rathke and Koeppel point out, the challenge is rather becoming "fit for culture" than achieving "cultural fit" (2007).

Concerning migrant students with Turkish background, intercultural competence means their ability to navigate between Turkish (friends and family in homeland, during holidays), German (university, firms) and German-Turkish subcultures (daily family environment), thereby crossing boundaries between private life, study environment and work environment (job parallel to studying, internships in German or Turkish firms). To make our project successful we have to look for cultural standards which have been developed during these processes of crossing boundaries and their impacts on migrant students' success in studies and work performance. Moreover, we have to look out for signs of re-shaping of the traditional cultural standards in German educational institutions with an increasing share of migrant students as indicators of an emerging new and "hybrid" culture.

To avoid "sophisticated stereotyping" (Osland/ Bird 2000) it has to be mentioned that even if cultural standards can be related to communities, each individual is supposed to enact the culture differently (Thomas 1993, 2003a, Liddicoat et al 2003). As Breidenbach and Nyiri (2008) point out, human actors have the choice among different cultural strategies, deciding personally which of those should be preferred. Thus, we cannot expect all members of one culture to perceive and act in a homogenous and stabile manner according to the predominant cultural standards of their society. Insofar, we have to look out for differences among migrant students, might those be connected to gender, to socio-economic background of family, region of descent, or even on academic program chosen.

We are well advised to develop a "dynamic approach to culture" (Liddicoat et al 2003), in which the cultural knowledge is seen as "knowing how to engage with culture" and "…culture learning is to provide a framework for productive dialogue between old and new understandings" (Liddicoat et al 2003: 8). Parallels to this can be drawn to Rimmington and Alagic (2008), who characterize the development of cultural identity in a global setting as a negotiation process with a long-term time horizon. This point of view has been gaining momentum in the international discourse recently. Antor points out that there always exists a remaining stock which cannot be understood by the other ("unverstandener Rest") (2007: 119). Therefore, intercultural competence on his opinion is about acceptance and enduring, even valuing, persistent differences ("Alteritäten", 2007: 119). Consequently, Antor recommends developing intercultural competence into transcultural competence (2007: 124), which rejects the idea of orderly separated cultures and connected stereotypes and opens to the above introduced idea of "hybridization".

Following this approach, the project reported here decided to invest resources into a monitoring system to learn more about the culture of Turkish migrant students in the Ruhr area – beyond existing stereotypes. Paper and pencil questioning was done to find out about the needs of migrant students. Existing data is currently analysed and will be related to outcomes from national and international research. Qualitative research was, and, ongoing, is carried out in form of semi-structured interviews, on an individual base or group-wise. "Frictions" among the cultural groups involved and the hereto related processes can be studied and appropriate interventions shaped. Based on those results and emerging insights, actions taken into consideration and tentatively realised will be evaluated and improved. We chose a slow path to allow processes of intercultural learning and organizational development to unfold and to be reflected and then improved by the actors in charge. By doing this, we rely on insights from the diversity management theory and practical experiences.

LESSONS LEARNED FROM DIVERSITY MANAGEMENT

In order to fully harvest the skills of migrant students, special actions have to be taken into consideration and in some parts already realised, covering three critical phases of the educational process:

1. Input: Selected partner institutions of secondary education and university are collaborating in preparing advanced students during their time at the secondary school on the technical dimension (first and foremost maths), improving their language skills (presentation skills, writers' workshop, crash course English), and concerning their individual goal-setting for life and career, including identifying appropriate study strategies. University students are trained and active as buddies or rather scouts. Cooperating with migrants' self-organizing associations is critical to get access to the students with migrant backgrounds and their parents. Based on this cooperation, the commitment and trustworthiness of the institution is supposed to grow.
Additional courses are offered to students during secondary school and in the period just before university starts. Tests have been developed which give students appropriate feed back on their math level. All this is organized by the "Access Academy", which is addressing all students with the desire to improve their skill, independent of their cultural background.
Nevertheless, all actions are customized to meet the needs of migrant students. In this context, differences among German and Turkish cultures concerning future orientation, time management, internalized control mechanisms, and (direct) communication must be taken into consideration as well as food preferences and religious restrictions. The strong role of family in the migrant cluster must be paid attention to as well as the distinct information channels of the parents. Therefore a "Parents' Academy" was conceptualized and sponsors opened up to allow the establishment of new and customized information channels.
2. Throughput: the basis established in phase 1 is stabilized by accompanying measures in the first study terms. Furthermore, additional language skills in the parents' mother tongue should be applied and certified during the study period. The students are encouraged to go abroad for studies and internships. Counsellors advise them how to apply for grants. Sponsors are granting special scholarships.
Mentoring is supposed to start in the second half of this phase. Former students (Alumni) as well as students in advanced stages of studying can be

very helpful as mentors. Additional role models (entrepreneurs, managers) with migrant background themselves become active to show what can be reached and how.

3. Output: Students are connected to alumni, building networks which provide connections and fresh insights into the labour market. Training concerning "to dos and not to dos" in the process of application, with an international focus, is offered. Again, cultural differences should be addressed to prepare students to perform in German and Turkish firms or in Turkish-German firms, respectively. Mentors with long years' experiences in business accompany students/ young alumni during the first stages of career.

All the activities explained above and more measures are part of the complete program which we call "FH Integrative", which has been conceptualized and is currently realized, step by step. "Integrative" means that we pursue a holistic approach, connecting actors from different institutions, different educational levels and different societal groups. All parts of the program are open to all students with talents and motivation to join us. Nevertheless, the program is designed to serve the migrant students' needs primarily. By following this strategy, we hope to establish a climate of inclusiveness, without activating a "stereotype threat" (see Roberson and Kulik 2007) to reduce existing "fault-lines" (see Lau and Murnighan 2005) and to avoid creating new ones between "German" and "Migrant" students.

According to the insights of research on diversity management, we chose to follow the learning and effectiveness approach (see Ely and Thomas 2001) with a medium-term perspective. The focus is not just on the use or even exploitation of potential resources, but on fostering and developing them. The complete university is supposed to – slowly – change its character and culture towards more openness and an international climate. This requires a certain mode of implementation based on a system's approach (see Aretz and Hansen 2001, Hansen/ Aretz 2002, 2006, Aretz/ Hansen, 2002). This approach combines the following functions

- Latent pattern maintenance by creating a diversity vision compatible with the university's existing values, at the core of which are educational performance and high-level research, both with a focus on practical application, and providing chances for everybody independent of the family's economical background.

- Integration on the internal dimension by developing an attitude towards diversity based on the needs of the organization and their members which prevents the split off of particular diversity dimensions (in this case: to prevent an isolated focus on migrants). On the external dimension integrations is secured by building bridges all over the community, especially to schools providing the university with students, to firms to whom bachelors and masters are delivered, and to communal and regional institutions which are dedicated to improve the chances of migrants.

- Goal attainment by building enabling systems and connecting them to existing systems (for example monitoring system, alumni network).

- Adaptation to the organizational needs and resource mobilization in the form of financial support, information and commitment to diversity and diversity management (in this case subscription to the Diversity Charta, fundraising from foundations, networking with external experts such as

those from state administration and communal institutions). A monitoring system is embedded into a "FH Integrative". This enables the university, firstly, to learn more about the needs of the target group, secondly, to measure the results of the activities, and, thirdly, to get an idea of acceptance inside the university and in its social environment, like the labour market.

The four functions can be combined with the "7-Steps-Approach", suggested by Becker, Huselid and Ulrich (2001) as a useful guideline for managing change in general. The combination of both is visualised in Figure 1 (next page).

Following those general guidelines, our university tries to find our specific way and pace, making a step back and advancing again as soon as one becomes aware of the fact that the recent level did not provide a secure base for the following one.

Logically we began by finding a core group of promoters to start the process. Representatives of the top management (university's board) committed themselves to the project, thereby fulfilling the function of a "power promoter". Critical was furthermore the choice of actors involved. Internal participants, as representatives of students and teachers and the management of university are connected to external participants as representatives from state ministries, schools, foundations, and business people in a steering board. The operative work is conducted by a small team and accompanied by several project groups, which are currently forming. They keep related "FH Integrative" to the departments and the actors working there, building an overall network. Several workshops with schools have been processed and overarching projects are currently designed. Applications to foundations and other institutions have been submitted and already shown success:

- Stifterverband and CHE (Center for the Development of Universities) have built a "Diversity Benchmarking Club" of which the University has become a member.

- The university received the "Arbeitgeberpreis" (Employers Award) for education in 2010.

The goal attainment is ensured by the fact that the project is directly reported to the university's president. Just now the project is proceeding from step 4 ("mobilizing commitment" which is still ongoing) to step 5 ("building enabling systems" by creating and stabilizing bridges to external actors and by running the "starters' school of"/access academy") in its second round in autumn 2011.2.

This example is supposed to be transferred to other universities as well. The university is part of a network of eight universities, organized by the Center of Educational Development and the "Stifterverband". Sharing ideas and experiences, supporting each other in developing diversity concepts and collaborative use of external resources are part of this network as well as organizing conferences in order to further spread the group's insights.

Step	Function/ Actions
Putting people in charge	**Resource mobilization:** Finding a core group of promoters who start the process: parts of the university's board, students, a distinct person in charge of initiating the project
Creating a shared need for diversity	**Adaptation/ Integration**: Setting up a "Strategy Map" connected to Diversity Management: Share of students with migrant background in region, demographic change in future, connection to -overall strategy of university and state
Shaping a diversity vision	**Latent pattern maintenance:** Drawing a picture of the future with relevance to the organisations' (economic) goals and the stakeholders' needs and wishes: Interviews with students, teachers, state representatives, teachers, business people etc.
Mobilizing commitment for diversity	**Resource mobilization:** Communicating the vision, broadening the range of actors supporting diversity management: steering committee involving politicians, business people etc., networking with schools, building a network of supporting professors, fund raising / applications for funding by different institutions. Information on the project by using established channels (newsletter, university magazine, senate meetings,…).
Building enabling systems	**Goal attainment**: In the beginning a project group or task force must be built, continually improved and connected to existing systems: to the university's board, reporting to academic senate. In the long run the project group should become a stable part of the university's administration. Integration of diversity aspects and especially migrants' needs into monitoring systems, international office / international activities (e.g. mentoring system), "access academy", mentoring, career services, scholarship funds.
Measurement and reporting of progress and effects	**Goal attainment / Integration:** Organising, measuring and communicating first positive pilots and their effects. Open discussion of chances and problems; inviting ideas to improve. Broad information by using established channels, modification and developing supplement channels.
Making it last	**Goal attainment**: Existing networks should be involved and the emergence of new networks encouraged. Systems in use are adjusted to diversity management and this adjustment is controlled.

Figure 1. 7 Steps Approach.

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Table 1. Overview on globe scores for Germany (west) and Turkey.

	Practice					Value				
Country	2	3	4	5	6	2	3	4	5	6
Humane orientation										
Germany		3.18D							5.46B	
Turkey		3.94C							5.52B	
Assertivenes										
Germany			4.55A				3.09C			
Turkey			4.53A			2.66C				
Gender Egalitarism										
Germany		3.10B						4.89A		
Turkey	2.89B							4.50B		
Future orientation										
Germany			4.27B					4.85C		
Turkey		3.74C							5.83A	
Performance orientation										
Germany			4.25B							6.01B
Turkey		3.83B							5.38D	
Uncertainty Avoidance										
Germany				5.22A			3.3 D			
Turkey		3.63C						4.67B		
CollectivismI (Institutional)										
Germany		3.79C						4.82B		
Turkey			4.03B						5.26A	
Collectivism II(Ingroup)										
Germany			4.02C						5.18C	
Turkey				5.88A					5.77B	

TYPOLOGY OF WORKERS AT THE END OF THEIR CAREER IN GERMANY

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ABSTRACT

Due to the demographic change, especially in Germany, the labour market has to face new challenges, e.g. lowered replacement fertility, raised life expectancy and increased average age of workers. As this group of elderly workers grows, their sustainment becomes an important issue that will challenge societies as well as companies in the future. Societies have to think about opportunities to reverse this trend by demographic "instruments" (e.g. higher fertility, higher amounts of migration flows) on the long run. Companies, on the other side should identify powerful instruments for motivating elderly workers to stay longer in the labour market and/or in the company. To develop appropriate tools to prolong working age, we need a better typology of older workers.

The analysis used in this study is based on a representative data set of the Federal Institute for Population Research of Germany from 2008. Here, 1,500 employees were asked about their job situation, motivation and demographic background etc. For the identification of homogenous groups, the cluster analysis is used. The employees will be categorized within different occupational groups (here white-collar workers, civil servants) using different variables (here work ability, motivation). With the description of the identified groups and their comparisons, recommendations for motivating elderly workers for longer periods of employment can be derived.

Key words: Bridge employment, Cluster analysis, Demographic change, Elderly workers, Motivation

INTRODUCTION

The demographic change leads to new challenges for the economy and the social security system, e.g. lowered replacement fertility, raised life expectancy and an increased average age of workers. These are all changes which the politics and the labour market have to consider. While the group of elderly workers grows, their sustainment will become even more important in the future (e.g. Höhn et al 2008, Dittrich et al 2011). This problem is relevant for societies and companies as well. Societies have to think about opportunities to reverse this trend by demographic "instruments" (e.g. higher fertility and higher amounts of migration flows) on the long run, while companies should identify powerful instruments for motivating elderly workers to stay longer in the labour market (or more specifically in the company).

As the combination of an ageing population, low fertility rates, and later entrance into the labour market suggests a future shortfall of active workers, it is *a sine qua non* for all actors involved in the process to take due action. Germany has three options that policy makers and companies need to face up in the coming decades. The future of the economy will depend to a great extent on the capacity to tap the strong potential of the

three growing segments in the population: older people, immigrants and an increased participation of women in the labour market. This study focus in the first segment as a potential work force.

We retain that promoting higher employment rates for older workers can be considered a serious alternative for dealing with the current shortfall of skilled labour force in Germany. This solution to this problem is essential for maintaining the country´s competitiveness on the global markets in the long run. It is clear that the ageing population will have large repercussions for the labour markets, economic growth, and public finances in Germany, but this is not to be perceived as an unexpected event that will overwhelm the economy when the baby boom generation starts to retire. It is rather a largely predictable process which can be manageable if the policy makers and the companies together recognize the problem and react in an efficient and timely manner.

It is in this context that our study is contributing. The works of Ilmarinen (2005), show that age is not a good proxy for workability and suggest the need for tools to analyze the factors that influence the decision to prolong the working age. But in order to develop appropriate tools to prolong working age, we need a better typology of older workers. Here the question to be answered is whether similar groups of workers at the end of their career exist and how they can be identified, described and motivated.

For this purpose we analyse here the German labour market as an example for a developed country. For the underlying empirical analyses, we use a representative data set of the Federal Institute for Population Research of Germany from 2008. Here, 1,500 employees (blue collar workers, white collar workers and civil servants) aged between 55 and 64 years were asked about their job situation, motivation and demographic background etc. (e.g. Büsch et al 2010). For the identification of homogenous groups of elderly workers the cluster analysis is used (e.g. Cormack 1971, Hair et al 2006). These groups will be identified within different occupational groups (e.g. white-collar workers, civil servants) using different variables (e.g. work ability, motivation).

In this article, we will start with an overview of the demographic factors concerning broadly EU and more specifically Germany and its population, as well as the challenges that are facing their current labour market (section 0). Based on a brief literature review, we will consider the job motivation and working ability of elderly workers and their motivation to stay longer in the German labour market (section 0). Finally we will conduct an analysis based on our empirical data base of a typology of older workers in Germany, by using a cluster analysis and will come up with results that describe the identified groups and their comparisons (section 0). The results will enable companies to better address the problem of an ageing population and contribute to the motivation of older workers to remain active and productive for a longer proportion of their working life. We will close with a short summary and an suggestions for further research (section 0).

SITUATION IN THE EUROPEAN UNION AND IN GERMANY
Demographic factors in EU and Germany
Due to the dynamics of fertility, life expectancy and migration rates, the age structure of the EU population is projected to dramatically change in the coming decades. As people's lives are being stretched out over an ever-longer period of time, in the next 5 decades the population is expected to be slightly larger, and much older than now. It is important to mention here that life expectancy has increased, to put it in J.W. Vaupel words, "*not because frailty lasts longer, but rather because it starts at a later age*" (frailty is the period in a person's life when someone starts to develop a disabling condition that

makes them dependent and vulnerable, leading eventually to death (Vaupel 1994)). This means that as a result, healthy life expectancy has been increasing at about the same rate as life expectancy (Vaupel and Lundström 1994, Vaupel 2010).

The Europop 2008 projections of Eurostat indicate that in Europe, by 2014, the working age population (20-64) will start to shrink, as the large baby-boom cohorts born immediately after World War II start entering their sixties and begin to retire. In fact the number of people aged 60 and above in the EU is now rising by more than two million every year, which is almost twice the rate observed until about three years ago. This means that the number of the elderly in the EU will almost double, rising from 85 million in 2008 to 151 million in 2060. Also the number of very old people (aged 80 years and above) is expected to increase by almost triple (from 22 million in 2008 to 61 million in 2060) (Eurostat 2010b). As a result, the working population in the EU is ageing and the proportion of older workers in employment is growing compared to the cohorts made up of younger workers (see Eurostat 2010a). This future scenario makes it an imperative to develop strategies to keep people active in the labour market at more advanced ages.

One of the responses to counteract this demographic trend was included, among others, in the Europe 2020 economic policy strategy (Growth and Job Strategy) in Lisbon by the European Council, in June 2010. But the strategy will be successful only if it takes into account a rapidly changing demographic context and it finds ways to use the full potential of an ageing and increasingly diverse population. The integrated flexicurity policies play a key role in this context. They aim to modernise and enhance at the same time, flexibility and security[7] in the labour market (EMCO 2009). Especially relevant for this article is the focus of flexicurity policies on raising labour utilization with an emphasis on older workers and extending working lives. Furthermore, they focus on measures to increase labour productivity with an emphasis on the reform of education and human capital policies over the entire life course. However, we have to keep in mind that commitments to undertake reform and concrete actions are not always congruent (Eurostat-UNECE 2010). This is the moment during which policies, company employment actions and demographic trends should be brought together in order to achieve sustainable outcomes.

Compared to other EU industrialized countries, Germany is especially affected from the demographic challenge. In the last decades, life expectancy has visibly increased and fertility rates have clearly declined. According to Eurostat data for the years 2020 and 2050, the proportion of persons aged 60 years and over in the EU, will grow substantially and rapidly over the next half century (Reday-Mulvey 2005). Although life expectancy in Germany is in line with the EU average, its old-age dependency ratio is already among the highest in the EU and expected to stay above the EU average. Notably for Germany, this means that over one third of its population will be over the age of 60 in 25 years. Compared to EU, Germany will therefore have the largest proportion of those aged 65 or over, with 20.7 %. This ageing process is set to proceed at a sustained pace until 2040 and then to almost halt in the 2040s and the 2050s (Eurostat 2010b). It becomes clear from this fact that when the baby-boom generation will be reaching their retirement, Germany will be subject to great pressure, especially when it comes to preserve its competitiveness in the global market. Following the same logic, its health care and pensions system will also be enormously affected during this period.

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[7] Flexicurity attempts to reconcile employers' need for a flexible workforce with workers' need for security and confidence that they will not face long periods of unemployment.

The demographic challenges for Germany in the future will be therefore manifold: 1. low fertility rates; 2. a net migration rate turned negative; 3. and a shrinking population that is continuously decreasing and projected to shrink by 10 % until 2050. Additionally employment rates of older workers are increasing, which means that the expected ageing-related increase in social spending will probably stay slightly below the EU average and that the share of older workers among workers is projected to increase noticeably in the next decade (Eurostat 2010b).

As a consequence, in order to increase and make better use of the labour force potential, the German government and companies have the following alternatives to consider in order to face up the major demographic transformations of the coming decades:

1. Integrate younger people earlier in the labour market

2. Include more women in the labour market

3. Focus on immigration

4. Extend older people's working lives

These policy areas should be considered crucial for boosting economic growth and achieving greater social cohesion in Germany. We retain that the promotion of elderly people and in particular of the active ageing baby-boomers is a key factor to overcome the demographic challenge as they possess valuable skills and experience and are expected to live many more years of healthy life. Keeping them integrated in the labour market with more opportunities will allow them to play an active part, according to their condition and abilities, to the economy and society as whole. Moreover, their involvement will allow younger people to extend their education and not be subject to pressure when it comes to the health care and pension systems.

The German political framework, albeit slow, has realized the relevance of the subject and has taken the first steps in this direction. So, the German Federal Parliament decided in 2005 to raise once more the age limit for the regular retirement age up to 67 years. This decision was issued in March 2007 and comes into effect in 2012. The paradigm shift in this field has already started and it has had its effects on the political landscape too. As a matter of fact, the point here is no more about whether older people should be working longer, but rather more about how to make it work so that it benefits all (Bäcker et al 2007).

German labour market and company situation
The number of persons who will be potentially available to the German labour market in the future will sink till 2025 by nearly 3.5 millions. But even with an increasing participation rate of women and elderly in the labour market, as well as an annual net immigration of 100,000 persons, the potential employee´s numbers will go back from 44.8 to 41.3 millions. This means that the number of the persons who will be potentially available to the job market in the next decade will be very close to the number of the employed persons today (which is nearly 40.8 millions) (Fuchs et al 2011).
In simple words, these figures show a considerable shortfall of people available to the German labour market in the future. That is why a paradigm shift is slowly emerging in Germany, regarding the so called *silver economy*, and is particularly concentrating on the economic potentials and power of the elderly people (Enste et al 2008). The fact, that there is an unused potential for the companies, can be supported from several studies. A survey made in 2008 in Germany shows that there is a high willingness (nearly 50 %) of older people to stay longer in the labour market (Dorbritz 2010 and

Dittrich et al 2011) Another study found out that a considerable number of the working people would agree to keep working even after their 65th year of life. As the main reason for their decision was mentioned the financial incentives available and the possibility to have additional income after their retirement (Opaschowski 2008). Similiarily, people who are in the passive phase of the older age show to be interested to stay longer in the labor market (Aleksandrowicz et al 2009). Comparable trends can be seen in the UK where according to a survey almost 93 % of non working people aged 55 to 64 years were willing to work if they had flexible working hours (Mercer 2004).Therefore policy and company actions that seek to help women and older workers reconcile work with family and health constraints will be making a huge contribution to meeting the challenge of an aging population (Ready-Mulvey 2005).

If actions are not taken in this situation, companies will be faced with huge losses in the future. A study from Ernst & Young made in Summer 2011 showed that the shortfall of skilled labour force and highly qualified professionals costs already 30 billion euros turnover to the German enterprises. Particularly difficult is the case for the small and medium enterprises (SME) in Germany, who seem to have sales shortfall reaching up to 30 billion euros/year. According to the same study, three out of four SMEs have already difficulties to find new and highly qualified professionals as employees. Additionally, every second SME fears sales losses, while two thirds of the enterprises expect things to get worse during the next years. Although the situation is serious, the study suggests that many companies underestimate the problem and have no clear plans on how to tackle the challenge.

These findings make it of paramount importance for the companies and specifically for their Human Resources Managers to identify powerful instruments among other measures, to motivate elderly workers to stay longer in the labour market. But what are the conditions under which older people are willing to extend their working life? Although financial incentives affect people's motivation to work longer, the limitation of such incentives is obvious as the decision to continue working is not up to the ageing person alone and depends on other factors as well.

RELEVANT FACTORS
So far most research has been done on pre-retirement decisions in Germany (for a comprehensive overview see Beehr 1986 and Feldman 1994) but little is known about the intentions of older people to continue working after their retirement age. Only recently the focus of research is changing (Kapteyn et al 2007). Whatever the reasons are, it would be preferable that people continue working because they would like to, rather than only because they have to, especially towards the end of life (Hult and Edlund 2008). Thus, in the light of the demographic forecast, it is important to increase our understanding of the individual and company related factors that influence ageing people's decisions to stay in or to leave the labour market. In this respect, especially in the American literature, there is already a considerable amount of research concerning bridge employment (Wang and Shultz 2010). This type of employment takes place on the transition period between full-employment and full-retirement and it involves continued paid employment after a worker has officially retired. This could be either a continuance of the former regular job or a different job (Ruhm 1990).

In order to fill the research gap concerning this topic in Germany, the following analysis is a first attempt to find out more about the willingness of older people to extend their working lives beyond their retirement age. Based on the results of our data analysis, we then aim to develop a typology of workers to derive appropriate measures to improve

their willingness of prolonging working life. In this context, if employees are willing to prolong their working life, human resource managers should consider first, if the workers are motivated at work, and second, if they are able to accomplish their tasks. A widespread tool to assess the level of work ability is the Work Ability Index, which uses self evaluation questions (Ilmarinen 2005). Consequently we are focussing here on four research questions:

1.   Do people wish to work beyond legal retirement age?

2.   Is job motivation and the decision of prolonging working life somehow connected?

3.   Is self reported work ability and the decision of prolonging working life somehow connected?

4.   Does a typology of work ability and motivation give insights how to promote older workers individually, instead of using age?

In the following we are going to summarize shortly the main findings in the literature with respect to

- age and prolonged working life,

- age and motivation as well as

- age and work ability.

The third chapter concludes by introducing our general approach of a typology of older workers:

Prolonging working life has been discussed only recently as an issue. According to McNair (2006), there is a division amongst attitudes to remain in the older workforce. Some people need to work due to resource issues, and others enjoy the chance to work. Also Saba and Guerin (2005) claim that, besides financial rewards, non-financial factors like perceived recognition play an important role in extending work beyond retirement age. The results are based upon research with 402 Canadian health care managers, aged 50 years and older.

The continuity theory of Atchley (1989) claims that middle-aged and older adults attempt to preserve and maintain existing internal and external structures. So it is quite probable that people with a high job motivation would remain in their job. Also Pienta and Hayward (2002) suggest that, it is more likely that workers with high intrinsic motivation will stay longer in their jobs. They used data from the 1992 Health and Retirement Study. Following these arguments, we want to test the correlation between willingness to work beyond retirement age, and motivation at the work place, since we assume a strong correlation between the two. According to Atchley, it can also be assumed that workers with high self reported work ability would be willing to stay longer. Another individual factor that might play a role for the decision is gender (Koloski et al 2001). In a study in Australia with older workers (50+) it was proved that different factors affect the willingness of women and men to work longer differently. Women are for example interested in social exchange and flexibility, while the relevant factor for men is the importance of the job (Shacklock et al 2009). So the significance of the job and job rewards seem to play a key role in this context.

To get some further insights to this question, the literature of fluctuation might be helpful. In some studies, it can be shown that younger workers are fluctuating more frequently than older ones (Rhodes 1983). Furthermore, it was proved that from a

statistical perspective job satisfaction influences the decision on whether to stay or to leave their job significantly (Lord and Farrington 2006). The recognition and support of colleagues and executive managers are also seen as motivating factors that play an essential role to the wish to prolong their working life (van Dam et al 2009).

Since *motivation* seems to explain the willingness to enhance working life, it would be important to identify relevant factors for motivation. In general it can be pointed out that the motivation between younger and older workers does not differ a lot, but the factors influencing the motivation are quite different. While young workers focus on security and on how the supervisor relates to them, older workers pay more attention to independence (Stamov Rossnagel 2009, Kooij et al 2010). But for both age groups, enjoyment and being proud of the job plays an important role for the motivation. According to the process motivation theory of Vroom (1964), motivation is defined as a process governing the choice made by an individual among alternative forms of voluntary activities. According to him, the valence of goal, as well as endogenous and exogenous expectations, influence the motivation of the worker. An endogenous expectation is the anticipation of my contribution to reach a goal, whereas valence refers to the evaluation of the sense and value of a certain goal. An exogenous expectation on the other side, is the individual assessment of a worker, on whether he thinks that his company will reach the fixed goals. A positive evaluation in this respect would then be influenced by the organizational environment that includes features like leadership and culture.

Warr distinguishes in his literature overview of work ability (WA) between cognitive, crystallized intellectual and fluid abilities (Warr 2001). It is observed that cognitive abilities change with age. While the crystallized abilities, such as general knowledge and verbal understanding increase, the fluid intelligence like working memory or reaction speed decrease. The labour market landscape for elderly workers is indeed a mixed picture. Negative age stereotypes continue to persist and are yet widespread. Older people are still seen as less productive than younger people. But age alone is not a good predictor for abilities, since the "older age group" is a quite heterogeneous group (Büsch 2004). Although a minority of an age group loses productivity over time, the majority of them seem to remain productive (Ilmarinen et al 1997). Several studies show that many job related factors explain the differences in the work ability (Alavinia et al 2007). In the so called house of work ability, leadership plays an important role (Ilmarinen and Tuomi 2004). Already in 1993, Warr pointed out that job performance may arise from a company's policy, so that self fulfilling prophecies may lead to a negative estimation about one's own abilities (Warr 1994). As a result it may be assumed that workers who receive high job rewards tend to evaluate themselves positively.

Due to the fact that older workers are a quite heterogenous group and work ability and motivation are not necessary correlated with age, we intend to develop a typology of workers at the end of their career. A development of a typology for Human Resource Management is a helpful tool to deduce a course of action accordingly for productive aging. Since motivation and work ability are central requirements in the job, the intended typology aims to cross the different levels (Table 1).

For the sake of clarity, we will give a short example on the explanation for type VII in Table 1: A low WA correlates with high motivation, which means that workers with a high motivation need further qualification in order to increase their work ability. Also a climate of confidence might help to detect the lacking abilities and to offer measures to fill the gap.

Table 1. Typology of workers with respect to work ability (WAI) and motivation.

WAI / Motivation	Low	Medium	High
Low	I	II	III
Medium	IV	V	VI
High	VII	VIII	IX

In the following chapter we will attempt to create such a typology with our data via clustering.

EMPIRICAL INVESTIGATION
DATA COLLECTION AND SAMPLE DESCRIPTION

The investigation is focused on the German labour market, selected as an example for a developed country. For the underlying empirical analysis we use a representative data set of the Federal Institute for Population Research of Germany from 2008. Here, in May 2008 a sample of 1,500 employees (blue-collar workers, white-collar workers and civil servants) aged between 55 and 64 years were interviewed by infratest (e.g. Büsch et al 2010). An overview about the socio-demographic and general job related characteristics of the total sample is shown in Table 2.

The majority of participants (71 %) is younger than 60 years. Regarding the level of education, respondents with successful apprenticeship or similar, encompass half of the sample (48 %). These are followed by university graduates or graduates from the university of applied sciences (30 %), master craftsmen/technicians or similar (17 %), and people with no vocational graduation (4 %). Employees have often jobs with qualified tasks (48 %). Most of the participants (75 %) reported a working time of 35 hours per week or more, while some (20 %) worked in part-time jobs with 15-34 working hours per week and only few (6 %) worked less than 15 hours per week.

The following data analysis is focused on two groups, since their job tasks are different, which should be – from a gerontological point of view – able to work longer: the white-collar workers and the civil servants. Due to their job conditions no physical constrictions should limit their general ability to work. Furthermore, only full time workers (with an employment with ≥35 hours per week) will be considered. So our analysis includes n=825 participants.

Table 2. Overview about the socio-demographic and general job related characteristics of the total sample.

Characteristics	Percentages (n=1,500)				
Age	**55:** 9.5	**56:** 17.9	**57:** 17.3	**58:** 12.9	**59:** 12.9
	60: 9.5	**61:** 7.9	**62:** 5.3	**63:** 3.8	**64:** 3.1
Sex	**Male:** 48.3			**Female:** 51. 7	
Hours per week	**≥35:** 74.6		**15-35:** 19.6		**<15:** 5.8
Occupational groups	**Blue-collar workers:** 24.5		**White-collar workers:** 63.5		**Civil servants:** 12.0
Company size (number of employees)	**<10:** 14.1		**10-49:** 25.6		**50-99:** 13.1
	100-249: 14.9		**250-499:** 9.0		**≥500:** 23.3
Branch	**Agriculture and forestry:** 1.4		**Power supply and mining:** 1.6		**Construction industry:** 4.0
	Industry and processing commerce: 19.0		**Trade:** 9.4		**Banking, credit institutions, insurances:** 4.6
	Traffic and communications: 3.0		**Hotel and catering industry:** 1 1.3		**Education, social affairs etc.:** 27.5
	Public administration, justice, police, military: 9.0		**Unions, public utility institutions, churches:** 4.0		**Other services:** 14.9
Time-limited job contract	**Yes:** 6.1			**No:** 93.9	

DATA ANALYSIS AND INTERPRETATION

The analysis is focused on work ability (using as item, e.g., "How high do you estimate your present work ability with respect to your job definitions?"), motivation (using "My motivation to work is very high.") and desire to continue working (using "Could you imagine to continue working after reaching your retirement age?"; see also section 0). Additional important factors, such as leadership (using, e.g., "In case of important issues, my supervisor informs me adequately."), job demands (e.g. "My work requires strong concentration."), job rewards (e.g. "The relationship to my supervisor is loyal and fair."), job satisfaction (e.g. "I am very satisfied with my work."), exogenous performance expectation (in the following "performance expectation"; e.g. "My company will reach its own objectives this year.") as well as age and sex are analysed.

All factors – except the desire to continue working, age and sex – are measured using a five point scale (with 1... "strongly agree"/"very important"/"very high" and 5... "strongly disagree"/"not at all important"/"very low"; numbers close to 1 represent high or positive judgements). The desire to continue working was measured using four categories ("yes", "rather yes", "rather no", "no"). The reliability (Cronbach's alpha) and mean values – differentiated for all three groups (white-collar workers, civil servants, combination of both) – are given in the overview in Table 3.

The reliability values in Table 3 show that the necessary requirements are fullfilled in most cases. Although the value for job rewards in the case of civil servants is critically low, the items for job rewards (respectively the mean values for these) remain in the

following investigation due to comparison reasons. A similar fact is given for job satisfaction with relative low values for Cronbachs' alpha in the case of white-collar workers. For interpretation (and ensuing recommendations) these two values should be viewed with caution.

Table 3. Cronbach's alpha (α), mean values (m) or percentages (%) for selected factors for all analyzed groups (values in parentheses for the reduced item scale in case of civil servants).

		No. of items	White-collar workers (n=679)			Civil servants (n=146)			White-collar workers and civil servants (n=825)		
Value			α	M	%	α	M	%	α	M	%
Work ability		2	0.682	2.340	–	0.637	2.267	–	0.675	2.327	–
Motivation		1	–	1.473	–	–	1.562	–	–	1.488	–
Desire to continue working	Yes	1	–	–	27.9	–	–	15.9	–	–	25.7
	Rather yes	1	–	–	22.5	–	–	17.9	–	–	21.7
	Rather no	1	–	–	18.3	–	–	21.4	–	–	18.8
	No	1	–	–	31.3	–	–	44.8	–	–	33.7
Leadership		3	0.714	2.350	–	0.769	2.262	–	0.723	2.334	–
Job demands		7	0.706	2.249	–	0.690	2.147	–	0.703	2.231	–
Job rewards		7	0.686	2.014	–	0.596	1.826	–	0.679	1.981	–
Job satisfaction		5 (3)	0.572	1.458	–	(0.643)	1.479	–	0.572	1.462	–
Performance expectation		2	0.653	2.556	–	0.684	2.420	–	0.658	2.532	–
Age		1	–	58.5	–	–	58.7	–	–	58.5	–
Sex	Male	1	–	–	55.7	–	–	59.6	–	–	56.4
	Female	1	–	–	44.3	–	–	40.4	–	–	43.6

The aim of our analysis is the development of a typology of older workers. Therefore we classify the groups of workers (all three analysed groups separately) using a multivariate classification method. The usage of such methods is common in a lot of fields, e.g., medical science, archaeology, biology, also in business administration and economics. Particularly when a total sample has to be divided into subsamples, typical classification methods have often been used for, e.g., segmenting groups of objects or reducing data. Cluster analysis is such a typical multivariate method for classifying objects into groups – so called "segments" or "cluster" – with respect to their similarity (e.g. Baier and Brusch 2008, Cormack 1971, Hair et al 2006, Punj and Stewart 1983).

We use here Ward's method as a hierarchical cluster analysis. This is carried out on the basis of z-standardised values of work ability and motivation, as segmentation basis (structuring variables) and after an outlier detection and elimination using single-linge clustering. The respective results (for the two structuring variables and all additional factors as description variables) are shown in Table 4 for white-collar workers, in Table 5 for civil servants and in Table 6 for their combination.

As the results show, a solution with six clusters (using the elbow criteria for cluster number selection) can be found. The need for nine different groups (as suggested for

the typology of workers with respect to work ability and motivation in Table 1) seems not to be given.

Table 4. Mean values (m) or percentages (%) for selected factors for the identified cluster segments within the group of white-collar workers.

		Value	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Size		%	20.9	40.1	12.1	6.6	10.2	10.2
Work ability		M	2.187	2.213	1.250	2.889	3.232	3.203
Motivation		M	2.000	1.000	1.000	3.444	1.000	2.000
Desire to continue working	**Yes**	%	29.1	29.7	29.1	20.5	33.3	16.2
	Rather yes	%	19.9	23.4	24.1	22.7	16.7	27.9
	Rather no	%	23.4	15.2	11.4	22.7	15.2	27.9
	No	%	27.7	31.6	35.4	34.1	34.8	27.9
Leadership		M	2.474	2.137	2.283	3.119	2.323	2.539
Job demands		M	2.345	2.230	2.190	2.441	2.031	2.292
Job rewards		M	2.079	1.851	1.938	2.450	2.155	2.191
Job satisfaction		M	1.624	1.270	1.277	2.160	1.389	1.683
Performance expectation		M	2.586	2.267	2.598	3.367	2.728	2.891
Age		M	57.9	58.7	58.3	58.6	58.6	58.9
Sex	**Male**		68.3	52.9	53.7	66.7	39.1	52.2
	Female		31.7	47.1	46.3	33.3	60.9	47.8

In comparison with the nine types of workers (for numbers in parentheses see Table 1), the six clusters represent the following:

- Cluster 1: medium WA – medium motivation (V)

- Cluster 2: medium WA – high motivation (VIII)

- Cluster 3: high WA – high motivation (IX)

- Cluster 4: medium WA – rather low motivation (II)

- Cluster 5: rather low WA – high motivation (VII)

- Cluster 6: rather low WA – medium motivation (IV)

According to this finding, the suggested typology can be reduced, for instance, the types I, III and VI are not applied. The desire to continue working (category "yes") is at the highest. in cluster 5 At the same time, a high disaffirmation (category "no") can be found in this cluster. Additionally, there is a high proportion of women in this cluster. A high potential for the desire to continue working can also be identified in cluster 2 (which is 40.1 % the largest). Altogether, high (work) motivation seems to be a precondition for the desire to continue working, although this is not a sufficient precondition.

Table 5. Mean values (m) or percentages (%) for selected factors for the identified cluster segments within the group of civil servants.

		Value	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Size		%	15.1	21.2	8.9	13.7	20.5	20.5
Work ability		M	1.250	2.000	2.615	3.125	2.650	2.183
Motivation		M	1.000	1.000	3.462	2.000	1.000	2.000
Desire to continue working	**Yes**	%	19.0	22.6	0.0	15.0	20.0	10.0
	Rather yes	%	4.8	16.1	23.1	25.0	20.0	20.0
	Rather no	%	23.8	22.6	38.5	10.0	23.3	16.7
	No	%	52.4	38.7	38.5	50.0	36.7	53.3
Leadership		M	2.015	2.098	2.923	2.717	1.933	2.339
Job demands		M	2.145	2.120	2.022	2.050	2.067	2.376
Job rewards		M	1.589	1.705	2.407	2.204	1.629	1.819
Job satisfaction		M	1.197	1.258	2.205	1.767	1.256	1.633
Performance expectation		M	2.023	2.310	3.192	2.825	2.200	2.433
Age		M	59.8	59.4	57.2	57.8	59.4	57.8
Sex	**Male**	%	68.2	61.3	84.6	45.0	56.7	53.3
	Female	%	31.8	38.7	15.4	55.0	43.3	46.7

In case of civil servants (see Table 5) types IX, VIII, I, IV, III and V are included – types II, VI, VII are not.

Here we can find two clusters (clusters 1 and 2, together 36.3 %) with high motivation und relatively high work ability. A high desire to continue working could be expected in this case (at least, this could be of interest for the company), but the respective values are very low. Especially in cluster 1 (with its very favorable values for motivation and work ability) more than 50 percent definitively do not want to continue working. However, in the largest cluster 2, most of the respondents could imagine to continue working (22.6 % "yes", 16.1 % "rather yes"). Problematic is cluster 3 (which is the smallest), where the most unmotivated ones are summarised and where no one has a clear desire to continue working (0 % "yes"). Here, most of the respondents are men.

While analysing the combined group of white-collar workers and civil servants (see Table 6), again an optimal solution with six clusters has been found. This indicates that there are overlaps between these two groups. In addition to the other solutions, a positive cluster can be identified (cluster 3, based on high motivation and on high work ability, where both values are close to maximum value 1). Here, nearly 50 percent of the respondents have a desire to continue working (27 % "yes", 20 % "rather yes"). In this cluster, the values for age and sex are unremarkable and similar to those of the total sample. The cluster with the highest desire to continue working is cluster 6 (31.5 "yes"), where a high proportion of women is visible.

Table 6. Mean values (m) or percentages (%) for selected factors for the identified cluster segments within the groups of white-collar workers and civil servants.

		Value	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Size		%	20.8	39.5	12.6	7.0	10.8	9.2
Work ability		M	2.186	2.213	1.250	2.828	3.185	3.224
Motivation		M	2.000	1.000	1.000	3.448	2.000	1.000
Desire to continue working	**Yes**	%	25.7	28.5	27.0	15.8	15.9	31.5
	Rather yes	%	19.9	22.6	20.0	22.8	27.3	16.4
	Rather no	%	22.2	16.4	14.0	26.3	23.9	16.4
	No	%	32.2	32.5	39.0	35.1	33.0	35.6
Leadership		M	2.450	2.110	2.224	3.075	2.579	2.324
Job demands		M	2.350	2.207	2.180	2.347	2.238	2.038
Job rewards		M	2.033	1.816	1.864	2.440	2.194	2.129
Job satisfaction		M	1.626	1.266	1.260	2.170	1.702	1.384
Performance expectation		M	2.559	2.258	2.476	3.328	2.876	2.713
Age		M	57.9	58.8	58.6	58.3	58.7	58.6
Sex	**Male**	%	65.7	54.0	56.7	70.7	50.6	40.8
	Female	%	34.3	46.0	43.3	29.3	49.4	59.2

CONCLUSIONS AND OUTLOOK

The paper has focused on the demographic change, which leads to new challenges for the economy and the social security system, e.g. lowered replacement fertility, raised life expectancy and an increased average age of workers. Countries, like in the exemplary case Germany have three options that policy makers and companies need to face up in the coming decades: Motivate older people, integrate immigrants and increase the proportion of women in the labour market. This paper has focused on the possibility to motivate older workers to stay longer in the labour market. For our empirical investigation we used a representative data set of the Federal Institute for Population Research of Germany and analysed the answers of full time working (≥ 35 hours per week) white-collar workers and civil servants. To develop a typology of workers at the end of their career we carried out a cluster analysis.

The results indicate that six clusters (that means six groups of workers) exist. Some clusters show good values with respect to motivation and work ability of the workers (which can be seen as preconditions for prolonging the working time of older workers) and to a certain degree, positive values for the requested desire to continue working. This analysis allows some estimations and interpretations regarding the proportion and the identification of potentially interested workers. Additionally, it shows an alternative for human resource managers.

So, cluster 5 of white collar workers is the group with the highest willingness to continue working. They have a low working ability and a high motivation level. Consequently,

workers in this group need mostly further education options in order to increase their work ability. Meanwhile in the civil servant group, the workers of cluster 2 are the ones with the highest probability to prolong their working life. Here the motivation is also rather high but the work ability is on a medium level. It seems that more job oriented education programs are necessary to improve the situation. Another interesting oberservation of civil servants is that in cluster 3 nobody is claiming "Yes" with respect to the desire to continue working. The civil servants in this group, are also the ones stating the lowest performance expectation of their company.

However, the results show two main weaknesses. Firstly, no cluster (and therefore no specific group of workers) with a clear and dominant desire to continue working could be identified. Secondly, the description – and in this context the identification – are problematic. The selection and the analysis of socio-demographic characteristics (here age and sex) seem to be inappropriate. Therefore, further research need to be done especially on additional variables, both, as additional items for measuring the desire to continue working and as describing features for the groups found. Furthermore, in order to achieve broadly relevant results, we suggest to have larger as well as new samples that include other European countries.

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RELEVANCE OF PERSONAL INFLUENCING VARIABLES IN LOAD TECHNIQUES

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ABSTRACT

Both musculo-skeletal disorders as the most significant group of diseases responsible for occupational disability and future-oriented company aims with an ageing work force require a sustainably ergonomic design of workplaces. Technical literature describes various techniques and engineering standards which aim at the detection and elimination of physical stress and strain. However, comparing the techniques makes clear that the various processes obtain different influencing variables and risk assessment, as well as different evaluation results. Thus, to make a statement about the process quality in order to evaluate work activities, we need evidence on the holistic comparability and selection of appropriate techniques on the basis of established quality criteria. This article's aim is to graphically depict and evaluate various characteristics of the personal and activity-related influencing variables within the selected limit load- and limit force techniques with the aid of the sensitivity analysis. They illustrate the impact of the consideration of age and sex within the methods on the evaluation results. In addition, further quality criteria for the comparison of strain techniques are being presented in order to deduce a user specific methodology for the benchmarking of particular methods.

Key words: Stress at work, Aging workforce, Ergonomics, Evaluation instruments, Evaluation techniques

INTRODUCTION

Despite increasing globalization and the accelerated development of new technology, the employees are undisputedly still the companies' most important factor of production. The employee contributes to the success significantly because of his efficient working, motivation, knowledge, and experience (Rudow 2004). As a result, the employees' competence, experience and health need to be conserved and supported, so that the necessary productivity and competitive ability can be assured in the future (Hellmann 2007). However, the current and future demographic change challenges companies to achieve economic and future-oriented aims with a work force that has changed regarding its age structure. The automotive industry expects the main age of employees to rise to 50 by year 2020. The companies base their estimation on the increasing age of the population since the 1970's, the step-by-step raising of the retirement age to 67 years and the elimination of state-subsidized partial retirement settlements (Bundesamt 2006, Bundesgesetzblatt 2007). This process will have far-reaching consequences for the companies, such as an increase in labour costs, an increase of absenteeism caused by illness, an increase of employees with performance restrictions, and decreasing working time flexibility. As a counteraction, many companies already voluntarily invest in their employees' health to be able to master future work requirements with aged employees. With regard to an ageing work force, companies should not focus on the health of elder employees only, but rather attend to every employee's health. They should attend especially to the younger personnel's health in form of prevention, to

positively affect the state of health in old age (Pfaff 2001). Many of these strategies are realized by means of single measures which are initiated from different sides and coordinated and executed in line with the operational health management system. To secure the operational health preservation and health promotion, the causes of illness and inability to work shall be systematically identified and appropriate measures shall be taken (Spicker and Schopf 2007).

Particularly musculo-skeletal disorders form the most significant group of disorders causing occupational disability. They increase in frequency and duration at old age (Niehaus and Vater 2010) and are caused either by work itself or by the employee's immediate work environment affecting both men and women equally by causing neck, shoulder and back problems as well as problems in the area of the upper extremities. Consequently, an ergonomic, stress reducing, efficient and quality assuring workplace design is necessary for the future value-adding deployment of ageing employees (Nöring, Dubian, Göldner, Klobes, Stumpf and Thiemich 2010). This is a challenge for the use of current techniques of ergonomic workplace evaluation and those which are being further developed. Factors of stress such as posture, action forces which need to applied, loads as well as repetitive actions are to be identified via an objective evaluation in order to subsequently be able to derive effective design measures (Schaub 2004). For this purpose, the work system needs to be systematically analyzed and evaluated. The hitherto existing methods range from non-extensive screening techniques to continuous measurements and combination techniques, which summarize single evaluation criteria to one wholesale validation (Ellegast 2005). Regarding the utilizability of these techniques, the quality of the survey and measuring instruments to be used is of essential importance. The aim of a quantified empirical survey is to provide comparable data, which help to derive comprehensible statements about the techniques' scientific and practical application (Hädel 2010). In summary, the application of individual techniques is basically determined by the single and summarized evaluation of the strain factors respectively, the influencing variables which have to be taken into account, the type of risk assessment, and the achieved evaluation result.
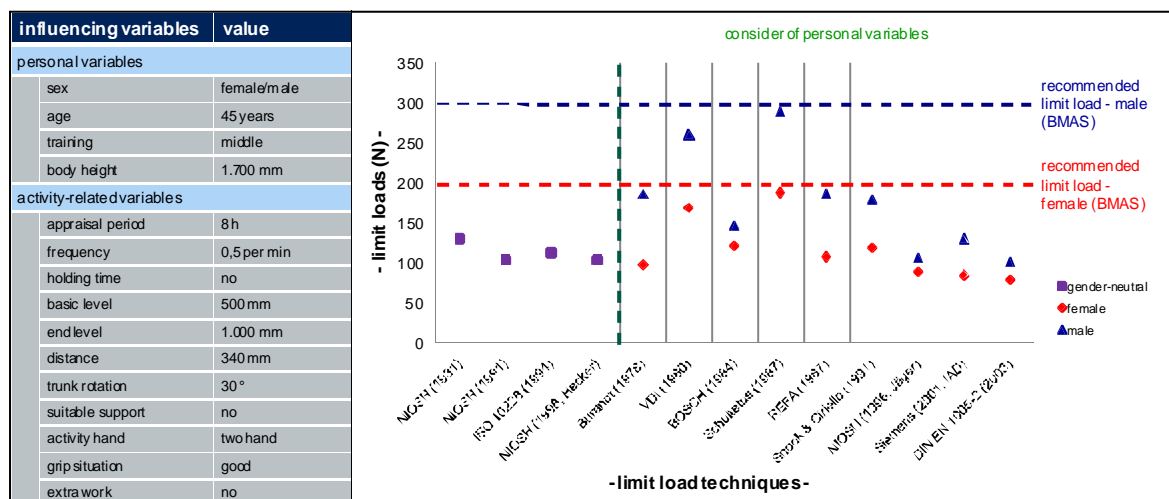

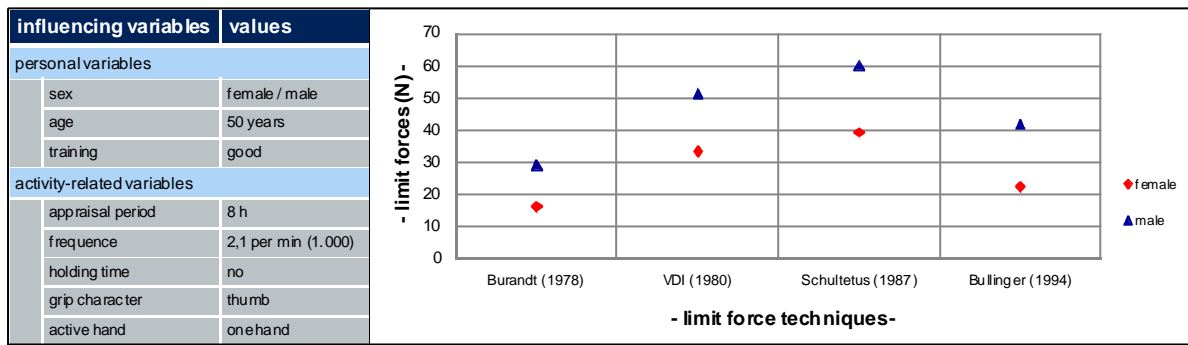**Figure 1. Different evaluation results of limit load techniques.**

influencing variables	values
personal variables	
sex	female / male
age	50 years
training	good
activity-related variables	
appraisal period	8 h
frequence	2,1 per min (1.000)
holding time	no
grip character	thumb
active hand	one hand

Chart (limit forces (N) vs. limit force techniques):
- Burandt (1978): male ≈ 29, female ≈ 16
- VDI (1980): male ≈ 51, female ≈ 33
- Schultetus (1987): male ≈ 60, female ≈ 40
- Bullinger (1994): male ≈ 41, female ≈ 22

Legend: ◆ female, ▲ male

Figure 2. Different evaluation results of limit force techniques.

However, comparable techniques in the consideration of similar conditions may result in different evaluation results. According to the "Bundesministerium für Arbeit und Soziales" (Federal Ministry of Labour and Social Affairs), all determined limit loads are below the recommended limits for both men and women. The limits specify which loads can lead to negative health impacts in case they are lifted or transposed. The techniques are similar in validity and consider activity-related influencing variables to describe workmanship and equipment objects of labour as well as personal influencing variables such as age, sex and fitness (Bullinger 1994). However, due to the evaluation results, a comparison is not possible (Bradt 2010). This conclusion is supported by the achieved results which can be seen in Figure 1 considering the sex-neutral and women's evaluation with an arithmetic mean of 116 N and a standard deviation of 32 N. The different evaluation results and the variety of different weighting factors and specifications which determine the workplaces' strain should be viewed with regard to the particular application. In order to particularly identify the specifications of personal influencing variables such as age and sex, opposite to the activity-related and organizational influencing variables, appropriate methods in relation to the sensitivity of the necessary influencing variables need to be used. With the aid of the sensitivity analysis, the most significant variable parameter for a certain result can be determined. In addition, critical values which can change the results in case they are exceeded or undercut can also be detected.

METHOD FOR THE DETECTION OF MEASURING SENSITIVITY
The sensitivity analysis is an instrument to evaluate the influencing variables themselves and their impact on the evaluation results. It is based on constructs of decision theory and examines the impacts of relative changes of either single influencing variables or variable combinations on the relative change of evaluation results in a technique (Siebertz, Bebber and Hochkirchen 2010). The aim of the analysis is to identify the variables which influence the evaluation results most of all in order to illustrate the relevance of personal influencing variables during the techniques. The advantages of this method are the easy practicability and the good interpretability of the detected analysis results. The sensitivity analysis is basically divided into factor screening, local and global sensitivity analysis (Reedijk 2000). The global sensitivity analysis is particularly important because it identifies the influence of variables in variation across the entire domain. Therefore, an improved comprehension of the importance of influencing variables can be achieved and the variables compared among each other. The examined influencing variables are varied by 10 % steps in order to detect new limit values. Those variables which have a strong influence on the result with a 60 % variation are strongly sensitive.

On the contrary, a low effect causes a 20 % variation at most. Figure 3 illustrates the relative change of the maximum load (kg) at the ordinate against the relative change of influencing variables (x-coordinate).
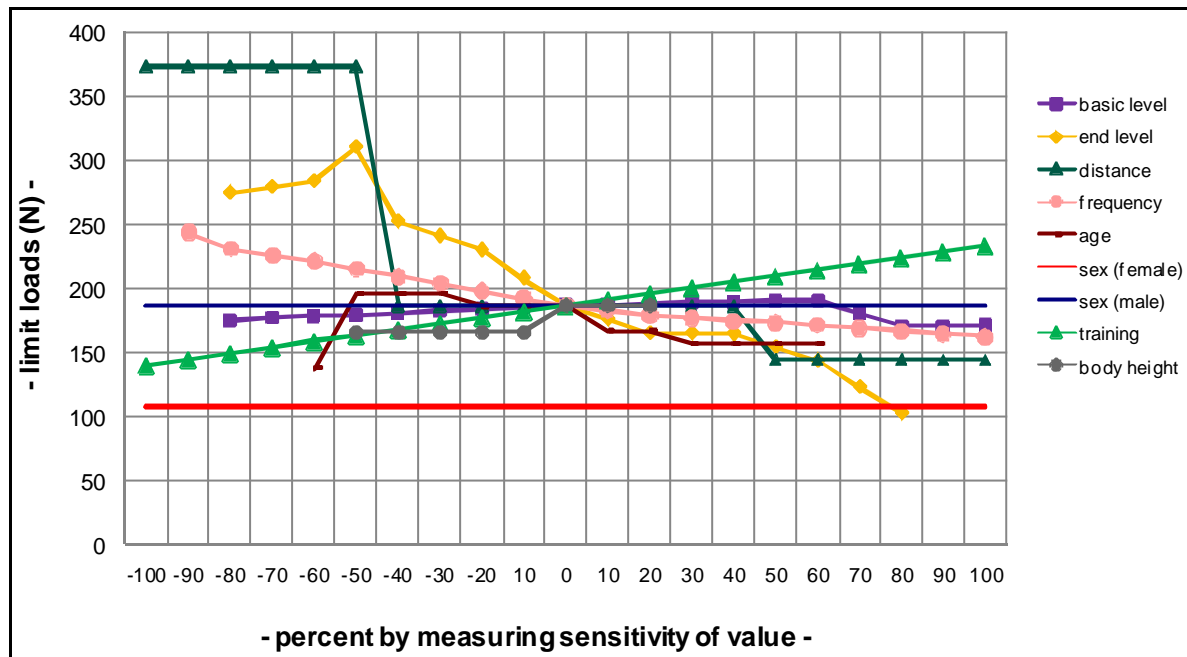

Figure 3. REFA with the results of sensitivity analysis.

Every graph depicts an influencing variable, which rises or falls and thereby refers to the criterion's sensitivity. The REFA technique (1987) is an example for the specifications of the different influencing variables in the maximum load techniques. It is based on the further development of Siemens (1969), Burandt (1978) and VDI techniques (1980). Next to activity-related influencing variables such as working height, distance, and frequency, personal influencing variables, for instance age, sex, body height and fitness are taken into account as well (HVBG 1995, Hecktor, Jäger and Laurig 1994). Figure 3 on the REFA technique illustrates the high sensitivity of handle end level, distance and frequency with the largest change of the maximum load with a relatively small change in the variables. If the handle end level is reduced from 100 cm to 50 cm, the maximum load increases by 67 % and reaches a limit value of about 31 kg. On the contrary, the mass decreases by 17 % to 16 kg if the handle end level is increased to 50 cm. The basic level has a low sensitivity, if it is reduced to the ground level, the maximum acceptable mass decreases by 10 % with a determined maximum load of about 1.9 kg. In comparison to further maximum load techniques, the frequency shows an average sensitivity. A reduction of the turn over frequency by 50 % to 125 relocation processes per shift causes a rise of the maximum load by 16 %. The duplication of the lifting frequency to one execution, however, causes a decrease of the maximum load by 13 %. Personal influencing variables show a low to average sensitivity. The determined limit values regarding age deviate between 13.7 kg and 19.6 kg, because the maximum load increases between the age of 15 years and 35 years and then slightly decreases depending on sex until the age of 60 years. Comparing the female and male sex, a decrease of the mass by 42 % can be identified. If the executing person is smaller than 1.65 m, the mass reduces by 2 kg. Fitness also indicates a low sensitivity. Consequently, the limit load increases or decreases by 25 % if a person is assigned to a different evaluation category. Regarding the analysis of the influencing variables'

sensitivity within the REFA technique it was determined that activity related influencing variables show a medium to high sensitivity.

On the other hand, the personal influencing variables show a low to medium sensitivity. Furthermore, the diagram illustrates that a decrease of the relative change leads to a higher sensitivity to the limit load than an increase of the relative change. Due to the high proportion of women in nursing professions and the increasing proportion of women in professions that are usually seen as typically male, Figure 4 depicts the influence of sex on the determined limit load.
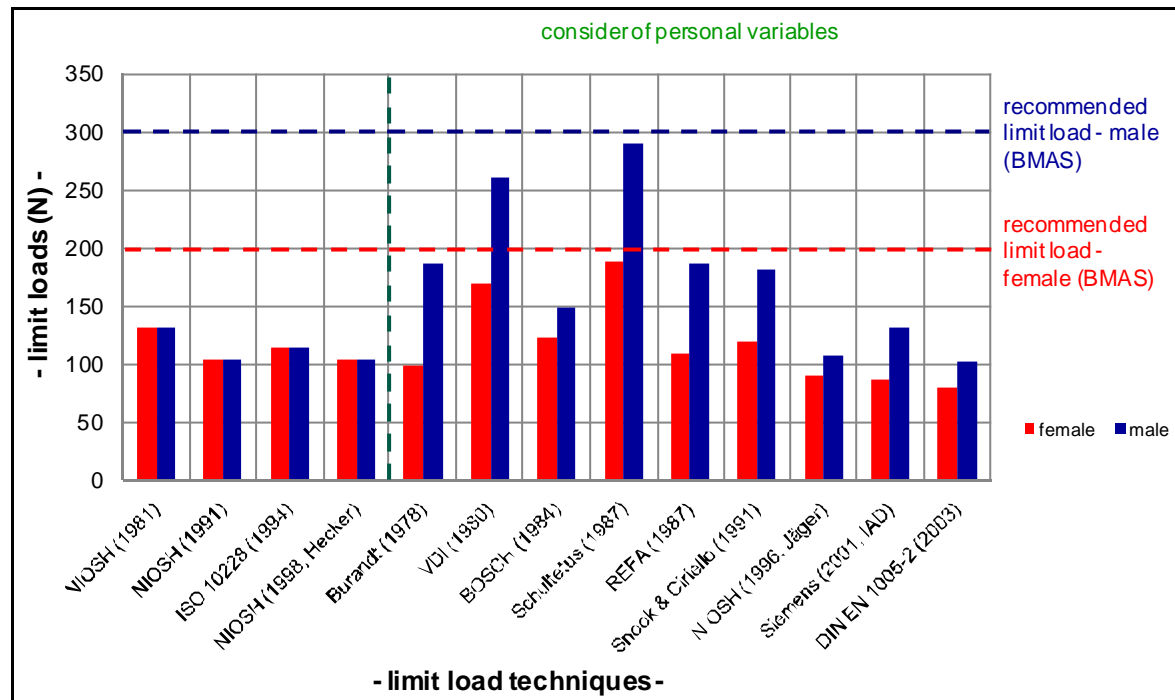
Figure 4. Influence of sex on the determine limit loads.

The results of the limit load evaluation of the VDI and Schultetus techniques differ strongly. The maximum load limit is 19 kg for women and 29 kg for men. All other techniques do not exceed the limit values recommended by the Federal Ministry of Labour and Social Affairs (BMAS) for both the female and male evaluations. Following the VDI and Schultetus techniques, the Burandt and REFA techniques show the highest deviation, 58 % and 65 %, between men and women. In consideration of the demographic change, age is of higher interest. Figure 4 illustrates an evaluation of age using the example of female employees. It appears that all depicted techniques, except the Siemens technique, show similar limit load graphs and a peak value at the age of 30 years. Both the REFA and the Siemens technique can evaluate an age range from 15 to 75 years of age. All other techniques consider ages from 20 to 60 years. The Schultetus technique is the only one which identifies a limit load for both female and male employees above the limit load recommended by the Federal Ministry of Labour and Social Affairs (BMAS).

SUMMARY AND PROSPECTS

The described study reveals that influencing variables in various techniques show different sensitivities concerning the evaluation results. As Table 1 illustrates, the activity related influencing variables have the greatest impact. Particularly the handle end level, distance, and frequency show high sensitivities.
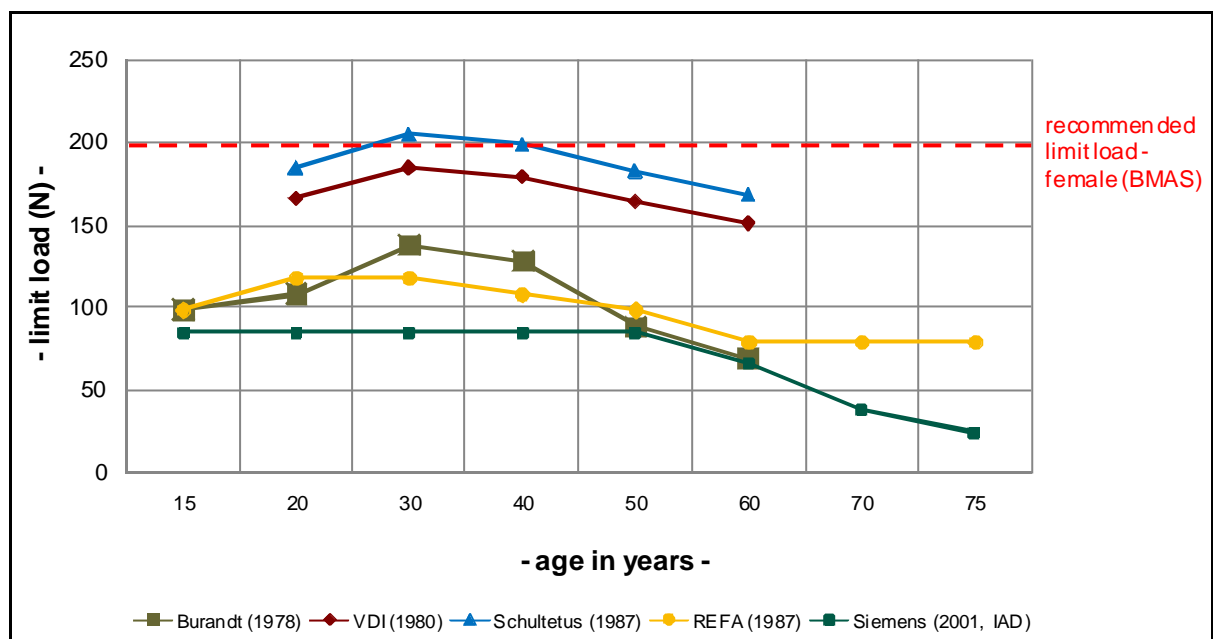
Figure 5. Sensitivity analysis of female samples.

Table 7. Different sensitivities concerning the techniques

	variables	NIOSH (´81/´91/´98)	NIOSH (Jäger)	Burandt	VDI	BOSCH	Schultetus	REFA	Snook & Ciriello	Siemens	Bullinger
personal variables	age	-	-	medium	low	-	low	medium	-	low	low
	sex	-	low	medium	medium	medium	medium	medium	medium	low	medium
	training	-	-	medium	medium	medium	medium	medium	-	medium	medium
	body height	-	-	low	low	-	low	low	-	low	-
activity-related variables	basic level	medium	medium	low	high	low	high	low	medium	medium	-
	end level	medium	medium	high	medium	medium	medium	high	medium	medium	-
	distance	middle	medium	high	high	high	high	high	medium	medium	-
	trunk rotation	low	low	-	-	-	-	-	-	-	-
	appraisal period	8 hours									
	frequence	high	high	medium	high	high	high	medium	high	high	high

It can be deduced that a straight posture, a small distance range for load handling, and a minimum frequency of execution are factors which should be considered during the design of workplaces. On the contrary, the personal influencing variables show a low to medium sensitivity. Particularly height has only little influence on the evaluation result. The specification of age subject to female and male sex is carried out according to the calendar with an age range from 15 to 65 years. In contrast, the analysis of fitness is carried out depending of different evaluation basics.

The various techniques describe fitness as either the physical constitution and habituation of the employees, the degree of practice in all individual areas or the timing of the application process throughout the product manufacturing process (HVBG 1995). Thus, according to the sensitivity analysis, the following design principles and individual aspects can be derived which may lead to a decrease of limit load and force:

- Unfavourable body postures
- Increasing distance of the load centre of gravity to the body axis

- Increasing frequency of load manipulation
- Decreasing basic height and increasing final height
- Increasing age after 35 years and
- Consideration of female sex

The consideration of activity related and personal influencing variables is necessary in order to identify stress considering individual aspects and to derive effective design measures. With the aid of the sensitivity analysis, we can identify the effects of the influencing variables, limit ranges in the evaluation of strain, and the techniques' deficits. With the exception of the Schultetus-Burandt technique, which can detect a limit load above the one recommended by the Federal Ministry of Labour and Social Affairs (BMAS) for the age of 30 years, the sensitivity analysis cannot give evidence about the utilizability of the various techniques. Consequently, relevant aspects of the analysis have to be highlighted in order to secure the comparability of the data and to enable an evaluation with regard to possible comparisons and dependences. Quality criteria are available to check the required comparability (Hädel 2010). They are used in empirical social research to scientifically legitimate studies and their results and to avoid measurement errors. In addition, they are also used to check and review the code of practice concerning standards. The point of origin for the identification of objectively measureable quality criteria is the detailed description of the necessary comparability. The systematical visualization of the techniques' comparability analytically examines the interaction between the techniques' developers and users. In this context it is necessary to know the exact aims of both the developer and the user. On the one hand, specifications are necessary in the development of techniques, so that the technique can be used as a measurement method in terms of its scientific quality (10075-3, 2004). On the other hand, the techniques have to be useful, appropriate to the particular problem, consistent, flexible, user- and organization-oriented as well as economical. It is also important that the data are available in the appropriate degree of information. The different requirements concerning completeness, truth, being up-to-date, accuracy and objectivity depend on the basic question (Siegwart 1998). Therefore, the quality criteria of quantitative and qualitative research can be divided into main and secondary criteria (Lienert and Raatz, Testaufbau and Testanalyse 1994, Steinke 2000). The main criteria include the classic quality criteria, for example objectivity, reliability and validity. The secondary criteria include economics, usefulness, standardization, plausibility, degree in which the results can be generalized, and transferability. The secondary quality criteria are predominantly practice relevant criteria. If a study does not feature these quality criteria, the scientific basics and necessary check studies are missing. Furthermore, single quality criteria can illustrate the interactions (Lienert and Raatz, Testaufbau and Testanalyse 1994). The development of an evaluation instrument for the comparability of evaluation techniques with the help of selected quality criteria requires a structured methodology (Figure 6).

The figure is based on an extensive literature research of the relevant quality criteria. The research requires an explicit definition of the quality criteria. Subsequently, clusters have to be generated, similarities and differences between the defined categories have to be identified and assigned to defined categories. An operationalization has to be developed for every quality criteria to be able to measure the evaluation instrument via
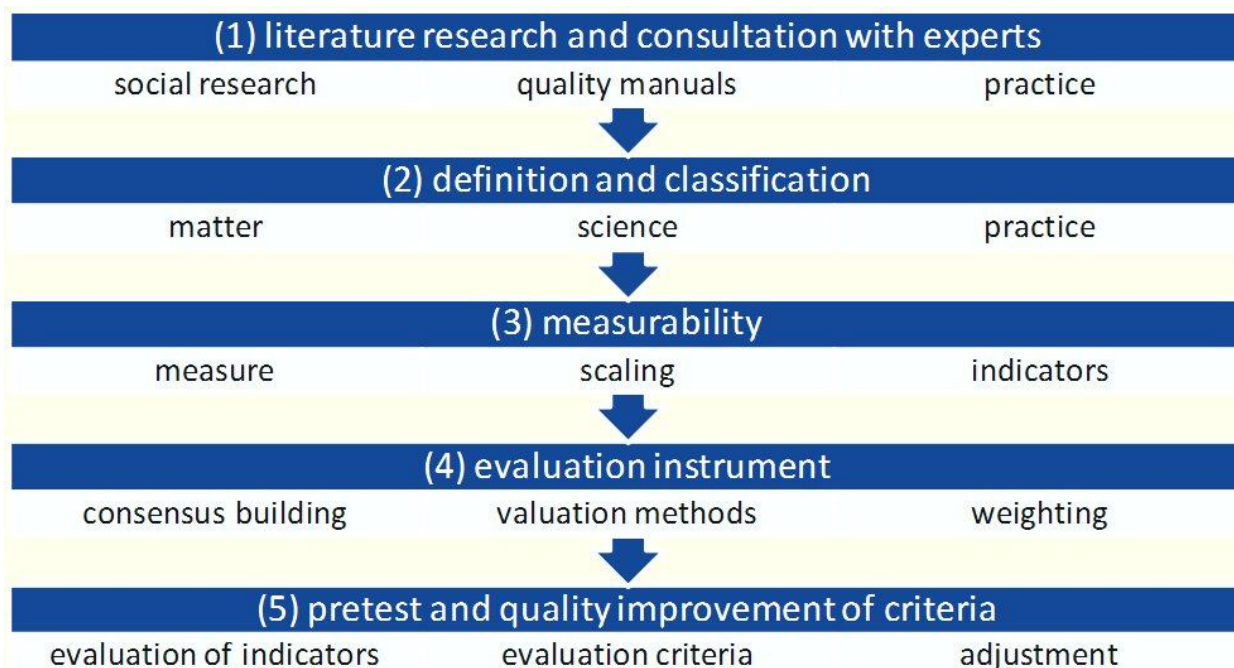
Figure 6. Methodology for the development of an evaluation instrument.

quality indicators. For the evaluation techniques, a consensus has to be found and evaluation methods have to be worked out based on the developed definitions of the quality criteria and the consequential operationalization. At the end, the quality indicators are evaluated with the aid of the evaluation instrument and the definitions and steps of operationalization as well as the instruments are worked over with the help of the results.

For the development of an evaluation instrument, specific quality criteria are required. Therefore an orientation towards criteria of quantitative and qualitative can be carried out. However, only criteria which do justice to both the developers and users of techniques should be defined and applied. Future studies should decide upon the appropriateness of criteria depending on the question and the object of investigation.

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"LIFELONG REHABILITATION" BY PHYSIOTHERAPIST IN THE NURSING HOME. INDIVIDUAL REHABILITATION BUILT IN ELDERLY'S OWN LIFE

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ABSTRACT

We introduced our intervention as "Lifelong Rehabilitation", which was an individual rehabilitation built in the elderly's own life, in a nursing home. About 4000 residents in nursing homes participated in our intervention. Problems in the enhancement of the residents' daily life function in a nursing home were ascertained by a physiotherapist. And, we instructed to care-workers and nurses in the action to improve their problem. Furthermore, care-workers and nurses were allowed to continue the intervention that lead to the result of evaluation by a physiotherapist as "Lifelong rehabilitation". As a result of this intervention, 91 persons have stopped ever using a wheelchair for locomotion and 488 persons have become able to walk independently, and 135 residents have improved their posture in daily life. The usefulness of our intervention was clear. The reason of this effectiveness is thought to be based on the physiotherapy evaluation, incorporation into the residents' lifestyle and care-workers' manual, and a good understanding and active cooperation by staff. As future issues we have to consider that our intervention may increase the risk of falling and whether our intervention is reliable or not. So, a longitudinal survey about falling after our intervention and a comparative study with a control group was needed.

Key words: Rehabilitation, Physiotherapy, Elderly care, Elderly home

INTRODUCTION

In a previous study (Daikuya et al 2010, Kuki et al 2010), we reported on the direct physiotherapy and indirect physiotherapy for elderly living in a nursing home. Both direct and indirect physiotherapy were a good tool for health support for frail older people. Health support for frail older people consists of an intervention for the improvement of the life function and health promotion. The improvement of the life function needs physical and mental functions and an enhancement of the staff and facilities. We also consider that a physiotherapeutic intervention is highly effective and useful for an improvement of the life function and staff education. Moreover, an overall intervention like this, which consists of physiotherapy, nursing, staff education, advice to facility construction and so on, we called "Lifelong Rehabilitation". Therefore, we performed physiotherapeutic interventions at nursing homes in order to improve the residents' life function, to educate staffs and to advice for enhancement of facilities and equipment.

In this study, we focus on the improvement of the ability of an individual to walk in a nursing home, and we introduce our intervention and its results and future issues.

SUBJECTS

We involved subjects from January 2007 to July 2011, and our intervention still continues. Thus, the numbers of homes and residents are gradually increasing, and current subjects are a total of 3943 residents in 59 private nursing homes.

METHODS

INTERVENTION AS LIFELONG REHABILITATION

Our intervention consists of direct and indirect physiotherapy. Direct physiotherapy means a functional training by a physiotherapist and indirect physiotherapy includes staff education, facility management, and so on. In our intervention for individual walking, firstly we searched the important factors related to the resident's individual walking ability, which search process is the physiotherapy evaluation. These factors are divided into two kinds, "internal factors" and "external factors". Internal factors comprised the patient's physical ability, and external factors consisted of the staffs' nursing ability, their assistance skills, and the facilities and equipment. On the basis of the above viewpoints, functional problems of residents in nursing home, which are body functions and structures, disabilities, limitation of participation, clinical findings, mental function, underlying disease and complication and so on, were ascertained by a physiotherapist. Secondly, we performed the direct and/or indirect physiotherapy based on the physiotherapy evaluation, but an individual functional training for resident, which is the direct physiotherapy, was not done as a rule except for the cases where direct individual physiotherapy was necessary by all means.

As the indirect physiotherapy, we instructed to care-workers and nurses in the method of operation and life style that overcomes the problem. Typical our guidance contents are as follows.

1) Instruction on the appropriate assistance to improve life function
2) Room development
3) Instruction of self and/or group exercise
4) Residential development for the prevention of falls
5) Description of the selection and use of aids and wheelchairs
6) Instruction of functional training and evaluation of impairment due to prolonged hospitalization
7) Selection and use of equipment such as operating instructions and the prevention of pain
8) Assessment of preventive care for a high degree of independence (Physical Fitness Test)
9) Construction of the system to improve motor function and exercise
10) Use of the training equipment
11) Lecture and practical training for care workers
12) Assessment of accidents.

After the physiotherapy evaluation, care-workers and other staff were expected to continue the program produced by the physiotherapist. The average number of individual physiotherapy evaluations for residents was 3 (range, 1 to 5 times).

RESULTS

From the beginning to the present intervention, 91 persons have stopped ever using a wheelchair for locomotion, 488 persons have become able to walk independently, and 135 residents have improved their posture in daily life.

DISCUSSION

The conceptual paradigm for the basis of intervention in this study is demonstrated in Figure 1 (Daikuya et al 2010).
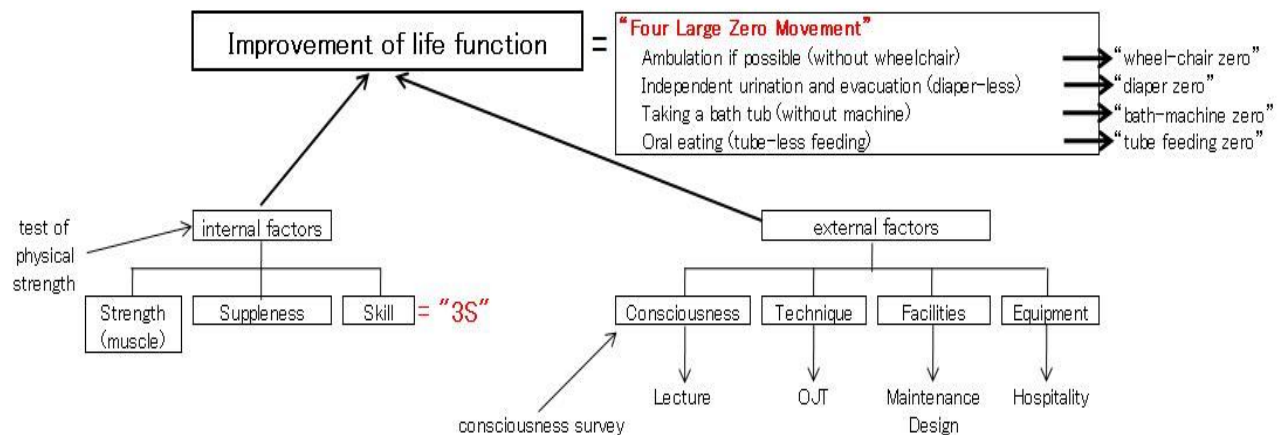

Figure 1. Our concept and paradigm toward the improvement of the life function of frail elderly patients.

To quote from the previous article (Daikuya et al 2010), the four points emphasized in this study were walking alone, which was called "wheel-chair zero", taking a bath without any support, which was called "bath machine-zero", going to the lavatory by themselves, which was called "diaper zero", and eating meals by themselves, which was called "tube feeding zero", and these four factors together were called the "Four Large Zeros Movement" at our hospital and company. The four large zeros movement can be considered an improvement in life function in the wide sense. The factors related to the improvement of the life function of frail elderly were considered to be the individual's own factors (internal factors) and those related to the facilities, equipment and/or staff (external factors). Internal factors were similar to physical fitness factors such as muscle strength, muscle power, suppleness (flexibility), agility, endurance and equilibrium. Because these factors can be put together as strength, suppleness and skill, we referred to these as the 3S required for a productive life. Therefore, to deal with internal factors to promote the four large zeros movement, a systematic intervention to improve the 3S is important. However, external factors involve the consciousness and nursing technique of the staff, along with the facilities and equipment available.

This study was continued research of the previous one. From the results of this study, we can present the positive points and future concerns in our intervention. First, positive points in our intervention were that our intervention was based on the physiotherapy concept. It was an important thing to be incorporated into the lifestyle of the residents and to be reflected in the work manual and working schedules of the care staff. On the other hand, the future concern included the following. The improvement of residents' function may increase movement opportunities. Then, the increased movement opportunities may increase the resident's falling risk. Therefore, longitudinal follow-up is needed. Secondly, a reliability verification of our intervention is also needed. So, a comparison study with setting a control group has been performed. Finally, our proposition is the continuity of the results of this intervention. To realize that, home staffs and residents have to stop being dependent on the ability of an individual physiotherapist and we have to build a universal system.

CONCLUSIONS

The usefulness of our intervention was clear. The reason of its effectiveness is thought to be based on the physiotherapy evaluation, incorporation into the residents' lifestyle and care-workers' manual, and a good understanding and active cooperation by staffs. As the future issues, we have to consider that our intervention may increase the risk of falling and whether our intervention is reliable or not. Therefore, a longitudinal survey about falling after our intervention and a comparative study with a control group was needed.

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EFFECT OF DIRECT AND INDIRECT PHYSIOTHERAPY FOR ELDERLY PEOPLE IN PRIVATE NURSING HOMES

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ABSTRACT

We performed physiotherapy for elder people to improve the locomotion ability of residents in the private nursing home. We have to pay attention to the risk factor produced by physiotherapeutic intervention and an improvement of locomotion ability. In this study, we investigated the number of falling of residents with improved locomotion ability due to physiotherapeutic intervention, and we considered the effect and the way of our intervention. We took the 140 persons, who became able to walk from fulltime wheelchair use, and 33 persons, who stopped using a wheelchair anytime for locomotion with staff's guidance. We researched the number of falling and outcome and its factor. As a result, 7 persons fell with fracture. Their falling factors were thought as follows; a feature and their own risk in individual room, fatigue, daily physical condition, the state of hall and corridor, the inexperience of the staff to guide, the lack of awareness of how to guide between staffs, and so on. For risk management, while we urge staffs to improve the resident's locomotion ability, we suggest guidance, assistance and creating a practical living environment based on the prospect of recovery and risk in the first intervention. The result of this study revealed that we have to consider the following events in our intervention and staff education: to be conscious of the resident's behavior pattern in the beginning of removing the wheel chair, to understand the falling history and/or an incidents, and how to guide by clinical records, an accurate daily clinical record, and to take care of environmental risk factors.

Key words: Risk management, Physiotherapy, Nursing care, Elderly home

INTRODUCTION

We aimed to enable the subjects to walk unaided without the use of a wheelchair. Our concept and paradigm were toward to improvement of life function in frail elder (Figure 1). We performed physiotherapy providing independent living for the elderly with an emphasis on four points. They are the ability to walk alone, taking a bath without any support, going to the lavatory by themselves, and eating meals by themselves. As an internal factor, we emphasize physical fitness such as muscle strength, suppleness and skill in activity of daily living. We instruct the subject physiotherapeutic exercises and self-management of residents' body functions in order to improve physical function as "direct physiotherapy". External factors, in turn, consist of the staffs' consciousness, nursing technique, the facilities and equipment. For care-worker and other staffs, we provide staff education, lecture, OJT, i.e., On-the-Job Training) and advice to each department. These interventions are "indirect physiotherapy"

METHODS

We instructed the employees in Japanese privately-owned pay nursing homes in the various methods of administering nursing care and exercise to residents in order to improve their locomotion ability. While life functions represented by locomotion ability have been improved, the risk of falling may have increased. We have to pay attention to

the risk factor arising from the physiotherapeutic intervention and the improvement of locomotion ability. The purpose of this study was a longitudinal follow-up survey of the outcome of our intervention and the clarification of the effect of our intervention.
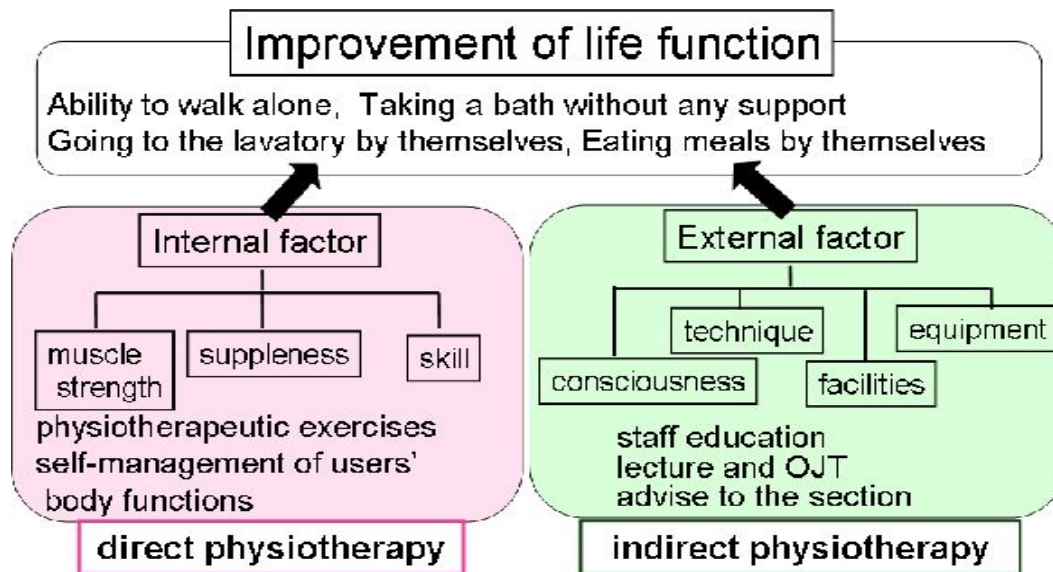

Figure 1. Physiotherapy concept.

PT INTERVENTION
In our interventions, the average number of physiotherapy sessions with the physiotherapist was 3 (range, 1–5 times). We only allowed one physiotherapist visit, except when further therapeutic consultation was necessary (Figure 2). After the physiotherapy session, care-workers and other staff were expected to continue the program (Figure 3, 4).

Figure 2. Physiotherapy session

Figure 3. A scene of walking at activity.

Figure 4. Exercises as individual programs.

In this study, the period of follow-up survey was for 18 months. The subjects were a total of 2074 elderly people living in 54 private nursing homes. Of the 885 fulltime wheelchair users, 33 persons have stopped using a wheelchair for locomotion. 140 persons have become able to walk with staff guidance. Especially, we investigated the number of falls of residents due to improved locomotion ability by the physiotherapeutic intervention and considered the effect and the method of our intervention.

RESULTS AND DISCUSSION

The result: of the 33 persons who stopped using a wheelchair, 2 persons fell with a fracture. Of the 140 persons with walking ability, 5 persons fell with a fracture.

CASE 1

Case 1 was female, and she was 77 years old. Her daily locomotion ability was walking, and sometimes using a wheelchair in a daily living. In our first physiotherapy intervention, we instructed staffs about how to assist walking to improve her walking ability. The next month she stopped using a wheelchair, and in walking the staff had to go with her. But after 9 months she fell with a fracture at the dining space. On the date of the fall, after dinner, she came back to her private room with the staff. On that particular day, she did not take the sleeping pill. she was detected lying alone on the dining floor. We speculated that she had probably walked alone from her private room to the dining space downstairs.

In this case, the risk factors were thought as follows. She was to take medicine regularly, being restless in mental function, bad visibility at the hall. In addition, her behaviour pattern was varying. She had the locomotion ability in large spaces. And the staff had to know the requested guidance properly and unified procedures between staffs. At the first PT intervention, we had advised about the risk of a fall. However, the

improvement of the locomotion ability made for extension of her space of action. She had been able to walk alone in the roomy hall.

The staffs were stationed at each floor, and they had to know the environment and her variety of behavior pattern in daily living. In this case, the staff needed to expand and change the guidance procedure after the fall. We have to consider these things well in our intervention. The staff had a lack of knowledge of the resident's behavior pattern at the beginning of removing the wheel chair. The enlargement of her space of action needed be expected. Therefore we need to suggest how to guide properly based on clinical records, and to take care for the environmental risk factors.

CASE 2
Case 2 was male, and he was 83 years old and diagnosed with osteoporosis. His daily locomotion ability was walking, and sometimes using a wheelchair in a daily living. From the physiotherapy evaluation, it was clear that he could walk independently. The next month he had stopped using a wheelchair, and after 2 months he had fallen with a fracture in his private room. On the date of the fall, in the daytime he had been able to walk independently. The information of the fall given by himself suggests that when he went to the lavatory by himself in his private room, he had a fall on his hip when sitting down.

In this case, the risk factors were thought as follows. He had osteoporosis and a high risk of fracture. And he generally had been walking alone to the lavatory by himself as a behavior pattern in his private room, and the staff had few checks and no close relation to his activity in his private room. We have to consider these things well in our intervention. We need to urge that the staffs understand the history of falls. There first intervention involved assistance and the creation of a practical living environment based on the prospect of the recovery and risk in the. And we suggested the necessity of knowledge about underlying osteoporosis.

CASE 3
Case 3 was female, and she was 85 years old. She was a fulltime wheelchair user. In our first physiotherapy intervention, we instructed the staff about how to assist walking and we modified the room environments.

The next month she stopped using a wheelchair, and after 4 months she fell with a fracture in her private room. She used the toilet beside her bed with the staff assistance. When she stood up from the toilet beside her bed, she fell. The risk factors in this case were thought as follows. The staff did not have an immature skill in guiding. She had also been able to stand up by herself but she could not walk without the staff guidance. In addition, there was a lack of awareness of how to guide between staffs.

In this case, the staff had to practice the unified individual guiding. We have to consider these things well in our intervention. The staff had a lack of knowledge of resident's behavior pattern at the beginning of the development. Therefore we need to suggest how to guide properly based on clinical records, and to take care for the environmental risk factors.

CASE 4
Case 4 was female, and she was 84 years old. She had been always using a wheelchair in daily living. From the physiotherapy evaluation, it was clear that she could

walk independently. After 10 months she had fallen with a fracture out of her private room. She had many incidents about standing up and walking in her private room. So, her activity in private room was monitored by the staff with a floor pressure sensor. On the date of the fall, since the staff forgot to switch the sensor on, she probably walked out of her private room alone.

In this case, the staff had to practice the unified individual guiding. And we have to consider the following things well in our intervention; residential development for the prevention of falls and individual environment of her room based on the assessment of her falling history and incidents.

CASE 5
Case 5 was female, and she was 82 years old. She had been always using a wheelchair in daily living. From the physiotherapy evaluation, it was clear that she could walk independently and we demonstrated the way of transferring to the chair in order to increase the frequency of the standing. After 2 months she fell with a fracture at the common space.

The risk factors in this case were thought as follows. The characteristic of the fall in this home was a wide space and difficulty in observing the residents' action. In addition, she had many patterns in her behaviour. She had the ability of locomotion in a large space. And the staff had to know the requested guidance properly and unified procedures between staffs. At the first physiotherapy intervention, we had advised about the risk of sitting. We have to consider these things well in our intervention. The first intervention involved assistance and creation of a practical living environment based on a prospect of the recovery and risk. And we suggested the necessity of the suitable seating order for the staff's consideration.

CASE 6
Case 6 was female, and she was 92 years old. She had been always using a wheelchair in a daily living. From the physiotherapy evaluation, it was clear that she could walk independently and we demonstrated the way of transfer to the chair in order to increase the frequency of the standing. Next month she fell with a fracture at the lavatory in her private room. And we demonstrated the way of transfer to the chair in order to decrease the frequency of the standing. After 2 months she fell with a fracture at the public space in the home. On the date of the fall, she went to the lavatory with the staff, and in coming back to the bed by herself she failed in stand up and fell.

In this case, the risk factors were thought as follows. She had many patterns in her behaviour. It is necessary to be conscious of a resident's behavior pattern at the beginning of removing the wheel chair. The staff had to know the requested guidance properly and unified procedures between staffs. At the physiotherapy intervention, we had advised about the risk of falling. We have to consider theses things well in our intervention. The intervention involved assistance and creation of a practical living environment based on the prospect of recovery and risk in the daily living.

CASE 7
Case 7 was male, and he was 83 years old. He had been always using a wheelchair in daily living. In the first physiotherapy intervention, we suggested promoting his walk ability. After 2 weeks he fell with a fracture at bedside in his private room. He was detected lying in midnight. Probably when he rolled over in bed, he had fallen down to

the floor. We have to these things consider well in our intervention. In this case, the staff needs to understand not only his locomotion ability but also the posture before standing up. It was difficult for him to sit up on the bed. So the staff had to understand his behavior pattern and own risk in his private room from the clinical records. It was important that we suggest to the staff to view his life function from different points in order to maintain his life function.

CONCLUSIONS

For risk management, it is important that we reveal the resident's physical function and capacity. It is also important that we suggest external factors of future life function based on the physiotherapy evaluation in order to think ahead and imagine future life function for the staff. In these cases, the staff had a lack of knowledge of the changed risk factor. Therefore, we have to suggest the necessity of alteration in the proper timing. This case involved not only the residents' locomotion ability but also differences in behavior patterns. Therefore, we need to suggest the timing of modified assistance and creation of a practical living environment to the staff. We need to demonstrate the way of observation and the point of evaluations.

IMPROVEMENT OF THE HEALTH OF SENIOR CITIZENS BY A PROGRAM ORGANIZED BY THE KINJO UNIVERSITY IN COOPERATION WITH HAKUSAN CITY

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ABSTRACT

Japan is an ageing society. Owing to a drop in birth rate and an increase in life expectancy, the overall population will continue to decrease in the future. It was surveyed that by 2007 elderly people will make up 21.5 % of the overall population, and by 2055, this is estimated to grow to 40.5 %. Thus it is imperative to maintain health and productivity among the elderly in Japan. Since 2009, the city of Hakusan, which has a population of 113,000 people, has been collaborating with the Kinjo University to co-sponsor the *Yuu-yuu Kenkou* group to promote health amongst community-dwelling senior citizens. Students studying medical care and welfare at the Kinjo University maintain and promote the health of these citizens primarily by training the subjects in the use of machine exercises. The purpose of this study was to investigate the effects of the health-promoting activity of this group on both physical function and health-related quality of life. Sixty-four community-dwelling elderly subjects who were prone to experiencing anxiety even when walking participated in this study after providing their informed consent. After the 10 week program, physical function and SF-36 questionnaire answers were significantly improved; thus, the beneficial effect of the group activity was evident. The group activity of Kinjo University in cooperation with Hakusan City contributed to the maintenance and promotion of health among community-dwelling senior citizens.

Key words: Health promotion, Student, Elderly people, Quality of life, Preventive care

INTRODUCTION

A survey by the Japanese Ministry of Internal Affairs and Communications Statistics Bureau and the National Institute of Population and Social Security Research revealed that 9.9 % of the Japanese population was aged 75 years or older in 2007. However, 26.5 % of the population was projected to be aged 75 years or older by 2055. Likewise, 11.6 % of the population was aged from 65 to 74 years in 2007, but this was predicted to rise to 14 % by 2055. In total, the population of people aged 65 years and older comprised 21.5 % of the population in 2007, but this was expected to increase to 40.5% by 2055 (Figure 1). (National Institute of Population and Social Security Research 2006, Japanese Ministry of Internal Affairs and Communications Statistics Bureau 2007, 2010). Therefore, the aging of the population will be a major problem for Japan in the coming decades. With an increase in the population of elderly people, it is expected that problems such as a rise in the social security budget and a labor population decline will grow in importance. Other problems to be faced include the increasing economic

burden on the generation of working age people and the caregiver deficiency. Therefore, maintaining the health of elderly people in the population is of paramount importance.
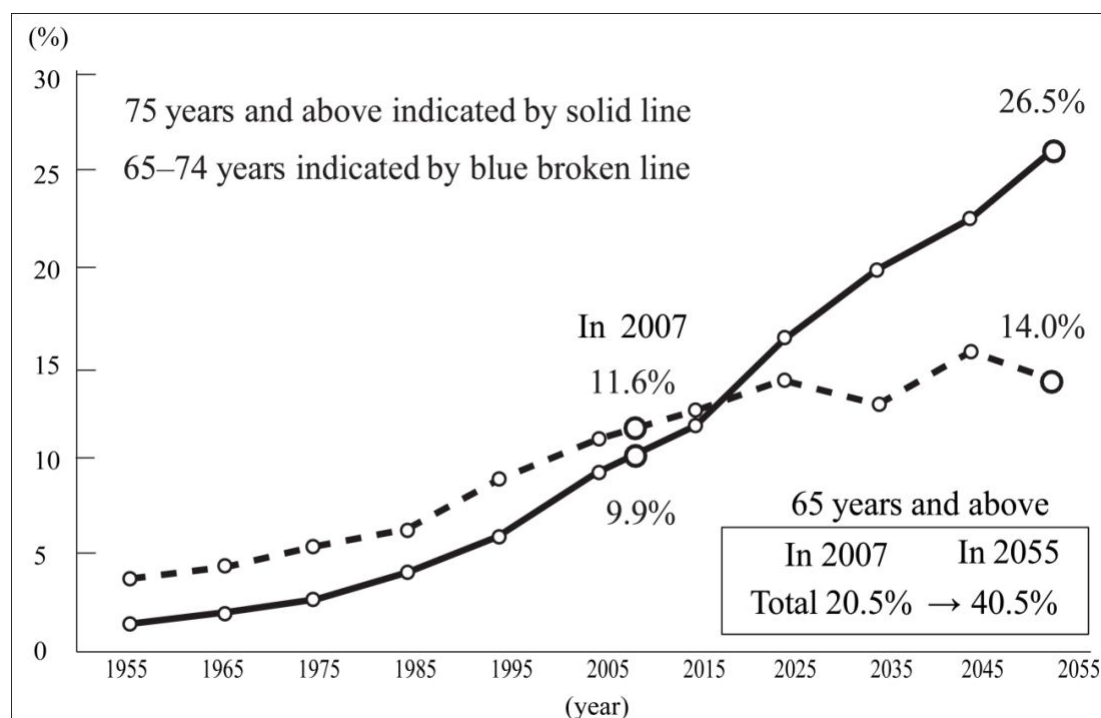

Figure 1. The proportion of elderly Japanese citizens over time (citation from references 1–3 was modified by author).

Since 2009, the city of Hakusan, which has a population of 113,000, has been collaborating with the Kinjo University to cosponsor the *Yuu-yuu Kenkou* group to maintain and promote health amongst community-dwelling senior citizens. Students studying medical care and welfare at the Kinjo University help maintain and promote health primarily by training the subjects in the use of low-load machine exercises.

The effectiveness of machine training and other complex programs for community-dwelling elderly people has not been reported. The purpose of this study was to investigate the effects of the health-promoting activities of this group on both physical function and health-related quality of life (QoL) in elderly community-dwelling citizens in Japan. In addition, we outline our approach.

METHODS
SUBJECTS

We targeted participants of the *Yuu-yuu Kenkou* group program that took place from 2008 to 2009. A total of 64 community-dwelling elderly subjects who were prone to experiencing anxiety even when walking participated in this study. All participants provided their informed consent. The average age of our subjects was 70±6 years, the average height was 157.7±7.7 cm, and the average weight was 57.7±7.8 kg. A total of 33 men and 31 women participated. All participants were recruited by the Hakusan City Support Center for the Elderly, which is a public institution.

The Yuu-yuu Kenkou group

The term *yuu-yuu kenkou* refers to a healthy, active elderly person who enjoys activity and feels he or she has something to live for. In cooperation with Hakusan City and Kinjo University, we sponsor the *Yuu-yuu Kenkou* group to maintain the health of the elderly citizens and increase their independence. The group program is held once a week for 2 hours for a total of 10 weeks, as shown in Table 1. Each group program includes about 15 elderly people, who are managed by about 30 students and 2 teachers. The group activity program is run by students studying physical therapy at Kinjo University in Japan. The programs include a vital signs check, warm-up exercises, lectures on the maintenance of general health, and instruction on the use of low-load machine exercises (e.g., leg press, knee extension, and chest press). Exercise intensity is set using the Borg scale at 10–12. Students also give the participants instructions on how to carry out the program at home and on cool-down exercises. Teachers at Kinjo University support the students. Students deal with most participants on a one-on-one basis. In a previous study, Miyajima et al (2010) reported that the chair-type training machine and training program with this machine are safe and effective for increasing muscle strength (Miyajima et al 2010). To assess the effects of the group, physical function is evaluated in the first and last sessions.

Table1. Outline of *Yuu-yuu Kenkou* group activity program.

Week	Contents
1	Physical function evaluation
2	
3	Vital signs check
4	Warm-up exercises
5	Lectures regarding the maintenance of general health
6	Low-load machine exercises for the elderly
7	Instructions to practise the program at home
8	Cool-down exercises
9	
10	Physical function evaluation

The Sports Division, Hakusan City Board of Education, provided the exercise institution and machine exercise room at no charge, and the elderly participants in the *Yuu-yuu Kenkou* group can continue self-training in the exercise institution after the group activity ends.

EXPERIMENTAL DESIGN

Before and after the program, we evaluated the flexibility, muscle strength, walking ability, standing balance, and QoL of the participants. Flexibility was measured using the "sit-and-reach" and "spinal hyperextension" tests. Muscle strength was measured using "grip strength," "knee extension," and "knee flexion." "Grip strength" was assessed by digital hand-dynamometer (GT-1201D;OG GIKEN, Japan), while "knee extension" and "knee flexion" were measured with 60 deg/sec isokinetic contraction by using an isokinetic machine (Cybex Norm; Shimizu Medical, Japan). Walking ability was measured using the "timed up-and-go (TUG)," "time needed to walk 10 m," and "distance walked in 6 minutes" tests. Standing balance was measured using the "functional reach," "1-leg standing time", and "length of postural sway of center of pressure (LS)" tests. Both the "1-leg standing time" and "LS" tests were performed with eyes open and closed. LS was measured by a pressure sensing device (Matscan; Nitta, Japan). Health-related QoL was measured using the "SF-36" questionnaire ver. 2 in Japanese.

STATISTICAL ANALYSIS

The statistical difference of test results for physical functions conducted before and after the program was evaluated using a paired t test. The statistical difference for the scores of the SF-36 questionnaire ver. 2 before and after the program was evaluated using the Wilcoxon signed-rank test. The statistical significance was set at *0.05* for all statistical analyses, and statistical software (SPSS version 17.0 in Japanese, IBM, USA) was used.

RESULTS

Results for physical function tests before and after the program are shown in Table 2. The results for the "sit-and-reach" and "spinal hyperextension" tests showed that the flexibility of the subjects significantly increased from 18.7±13.2 cm/21.3±11.3 cm to 20.5±13.3 cm/22.8±10.5 cm, respectively. In terms of muscle strength, "grip strength" significantly increased from 28.6±8.6 kg before the program to 29.6±8.6 kg after the program. In addition, "knee flexion" significantly increased from 48.9±20.0 Nm before the program to 53.4±21.2 Nm after the program. However, the results for "knee extension" did not differ significantly before and after the program.

In terms of walking ability, the "TUG" improved from 6.6±1.6 s before the program to 6.3±1.2 s after the program. The time needed to walk 10 m improved from 5.1±1.5 s before the program to 4.8±1.2 s after the program. Therefore, the average distance walked in 6 minutes after the program was significantly longer than that before the program.

Regarding the standing balance of the subjects, the "functional reach" test increased significantly from 26.8±6.0 cm before the program to 27.9±5.2 cm after the program. The results for "1-leg standing time" and "LS" did not differ significantly before and after the program. In the SF-36 questionnaire, "general health perception" was significantly improved by the program, as shown in Table 3. However, the other scales in the SF-36 did not differ significantly before and after the program. In addition, "that energy appeared when they talked with a student" and "got the power of a young student" were impressions conveyed by the elderly participants.

DISCUSSION

Owing to a decrease in birth rate and an increase in mortality rate, Japan's overall population will continue to decrease in the coming years. By 2030, the proportion of elderly people is estimated to reach 31.9 % of the overall population, and by 2055, this is estimated to grow to 40.5 %. (National Institute of Population and Social Security Research 2006). To prepare for this forecast increase in elderly population, the nursing care insurance law was established in 2000. This form of national insurance provides financial support for people who need nursing care. The nursing care insurance law in Japan is categorized in Table 4. The supply ceiling is selected for every classification. The "independent" category represents people not requiring care. People in other categories require some support or nursing care. In the city of Hakusan, 84 % of the elderly population were categorized as "independent" whereas 16 % of the people were categorized as needing nursing care in a 2009 statistics report by the city (Hakusan 2010). It is important to maintain the health of those in the independent category. Haley et al. supposed that functional health appeared to be particularly important for participation in physical activity (Haley et al 2010). Therefore, functional health is important for elderly people.

Table 2. Comparison of physical function test results before and after the program.

	Before Average ±SD	After Average ±SD	p	n
<Flexibility>				
The sit-and-reach test (cm)	18.7 ±13.2	20.5 ±13.3	$p<0.05$	64
Spinal hyperextension test (cm)	21.3 ±11.3	22.8 ±10.5	$p<0.05$	62
<Muscle strength>				
Grip strength (kg)	28.6 ±8.6	29.6 ±8.6	$p<0.05$	42
Knee extension (N)	90.3 ±30.9	92.3 ±32.8	0.34	61
Knee flexion (N)	48.9 ±20.0	53.4 ±21.2	$p<0.05$	61
<Walking ability>				
Timed up-and-go (TUG) s	6.6 ±1.6	6.3 ±1.2	$p<0.05$	62
The time taken to walk 10 m (s)	5.1 ±1.5	4.8 ±1.2	$p<0.05$	62
Distance during a 6-min walk (m)	498 ±105	512 ±100	$p<0.05$	62
<Balance of standing>				
Functional reach test (cm)	26.8 ±6.0	27.9 ±5.2	$p<0.05$	64
1-leg standing time (eyes opened) cm	34.5 ±22.9	36.0 ±22.1	0.22	62
1-leg standing time (eyes closed) cm	20.3 ±23.0	20.0 ±23.2	0.44	62
Length of postural sway of center of pressure (LS) eyes opened (cm)	46.7 ±14.2	48.8 ±14.9	0.08	62
Length of postural sway of center of pressure (LS) eyes closed (cm)	72.4 ±32.5	69.3 ±28.6	0.20	62

Table 3. Results of SF-36 questionnaire before and after the program.

SF-36 questionnaire version2 (Japanese)	Before Median value	After Median value	p
Physical functioning	44.6	48.1	0.1
Role-physical	44.3	47.7	0.28
Bodily pain	48.6	50	0.16
General health perception	47.5	47.5	$p < 0.05$
Vitality	53.3	56.4	0.16
Social functioning	50.5	53.8	0.48
Role-emotional	43.8	43.8	0.75
Mental health	51.8	50.4	0.18
			n=28

Table 4. Classification and supply-ceiling of the nursing-care insurance law in Japan.

Category	Details	Supply ceiling (every month)
Independent	Care service unnecessary	0
Support required 1 Support required 2	Support required several times a week	About 500 euro
Need of nursing care 1	Instability regarding standing up and walking	About 1,400 euro
Need of nursing care 2	Cannot sit up oneself	About 1,600 euro
Need of nursing care 3	Cannot sit up and roll over oneself	About 2,229 euro
Need of nursing care 4	Severe disability regarding activity of daily living	About 2,550 euro
Need of nursing care 5	Maximum severe disability regarding activity of daily living	About 3,000 euro

In this study, after the elderly participants took part in a 10-week exercise program, physical function was significantly improved. This result suggests that low-load training, mainly via machine exercises, combined with the home program improved muscular strength in the lower limbs. Walking ability also improved. Chandler et al. proposed that the lower extremity strength gain is associated with gains in chair rise performance, gait speed, and in mobility tasks such as walking, transfers, stooping, and stair climbing (Chandler et al 1998). These results lead us to believe that muscular strength in the lower limbs, for example, "knee flexion", is associated with walking ability (e.g., "TUG" and the "time needed to walk 10 m"). Studenski et al. concluded that physical performance such as gait speed and rising from a chair are estimates of future risk for hospitalization and decline in health and physical function (Studenski et al 2003). Therefore, the improvement in walking ability meant direct health promotion.

In our study, average results for males and females in the functional reach test were 26.8 cm before the program and 27.9 cm after the program. These results do not concur with those of Duncan et al, who reported that average values for the functional reach test for elderly people aged 70 to 87 years were 33.4 ± 3.9 cm (male) / 26.6 ± 9.0 cm (female) (Duncan et al 1990). Our results were slightly lower. The reason for this difference was a difference in the measurement methods used. We measured functional reach using bilateral reach, whereas Duncan et al. measured this by unilateral reach. With that taken into account, there was no major difference.

Conversely, after the 10-week program in this study the SF-36 questionnaire results on "general health perception" significantly improved. One possible reason for the improvement is that an increase in physical function increased "general health perception." Another possible cause for the improvement derives from the fact that the communication between the elderly study participants and the young students positively stimulated the elderly people and boosted their motivation to participate in the activities.

The impression "that energy appeared when they talked with a student" and" got the power of a young student" was conveyed by the elderly participants.

After a 10-week low-load machine training program, physical functions and health-related QoL were significantly improved in elderly people in Hakusan in Japan, and the beneficial effect of the group activity was evident. Thus, the group activity managed by Kinjo University in cooperation with Hakusan City contributed to the maintenance and promotion of health among community-dwelling senior citizens.

LIMITATIONS OF THIS STUDY

This study did not have a control group This will be necessary in the future. In addition, more research is required into the most effective machine exercise intensity to increase health in older people. In Japan, depopulated areas have higher rates of aged populations, and this is also true for Hakusan. The proportion of people who are 65 years or older in this city corresponds to the average for this group in Japan. However, elderly people 65 years old or older comprise 19.4 % of the urban area population, whereas they comprise 26 % of the population of the depopulated rural area. Unfortunately, elderly people living in the depopulated rural areas in the mountainous district could not participate in our program. We need to determine how to facilitate participation of elderly people living in distant areas in this program.

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INFLUENCE OF HEALTH INFORMATION ON THE QUANTITY OF PHYSICAL ACTIVITY AND VENOUS BLOOD FLOW REACTION TIME IN ELDERLY WORKERS

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INTRODUCTION

Among the issues surrounding elderly citizens' works, what are the most surfaced problems? What are challenges commonly shared by people across different countries, regardless of the obvious gap in their environments and people's thoughts? One common fact is that we have to eat in order to live, and that we have to work in order to eat. One type of jobs targeting aged workers is designed to directly engage them. Another type of works for aged workers is the ones created through the process of bringing out the workers' abilities. This study requires these two elements. As an overview of worldwide population aging rate, below are the population rates of people aged 65 or above in the entire population of respective OECD member countries. As of 2008, Japan's rate was 22.1 %, which is the highest in the world, followed by Germany and Finland. There is one common aspect shared among these countries. In all these countries, the aged population can be divided into two groups. The people in the first group are the ones who damage their health and receive nursing care to live. The second group is the people who remain healthy and keep on working. As for the industry for aged workers, the biggest majority is engaged in agriculture. The problem here, however, is that the measures to maintain their ability to safely carry on the works is yet to be established. The figure below illustrates fatal accidents during farm works. It shows the nationwide number of fatal accidents during farm works in the past five years. The numbers are sorted by the victims' age group. An astonishing 80 % of the total death cases are people aged 65 or over. In 2009, a total of 408 people died while engaging themselves in agricultural works, and 80 % of them were 65 or older (Figure 1).

In retrospect, the agricultural population began to dwindle about 40 years ago, when industrialization transformed the agricultural workers in the rural areas into factory workers in 1970s. To cover the insufficient labor force, machines were introduced to agriculture. In order for the machines to be installed at the farms, they had to be able to run the roads; hence tractors, the farm equipment with mobility, were developed. This machine quickly became popular across the country. Ironically, 60 % of the total injuries today are tractor-related accidents.

The problem is the frequency of deadly accidents during tractor-related works. What needs to be solved in the first place is the measures to maintain workers' ability to safely conduct their farm works. Accidents during farm works can be largely divided into two categories. 50 % of the total accidents occurred while operating mobile farm equipment or tractors. Another 30 % was burn injuries due to catching fire while burning weeds, etc. Amongst the tractor-related injuries, 70 % were falls triggered by wrong operation. The cause of accidents is attributed to the workers' inability to react instantly to the situation. The slow reaction is in fact the result of reduced capacity due to aging and the so-called "lack of oil" due to physical inactivity.
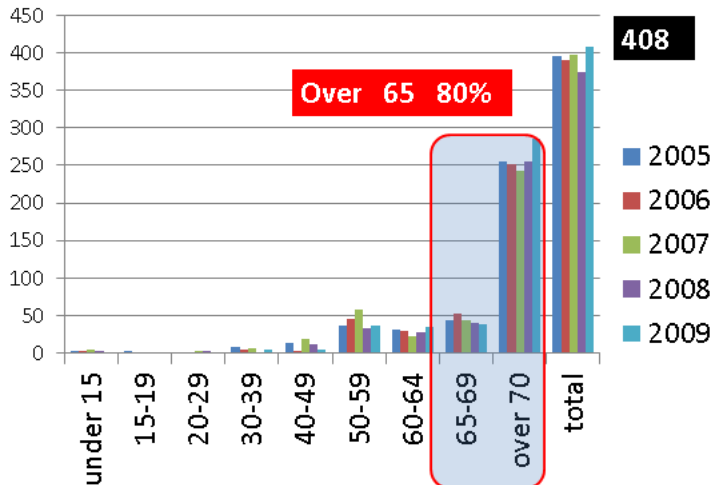
Figure 1. Number of fatal farm accidents in Japan.

What should be done to enable the elderly people to self-manage their health and maintain suitable health condition that can ultimately serve to prevent harmful accidents from happening? To tackle this issue, the theme of this study was set up. The study was designed as crossover RCT in the field. First of all, we found leaders among the aged citizens in the local community. They were the representatives of autonomous organizations. However, their organizations were not related to any religions or political sections. We explained them what we were going to do. We requested them to provide the space, period of time, and number of participants for the project as well as recruitment of participants. Thus, the structure of the project was formed, and it functioned properly (Figure 2).
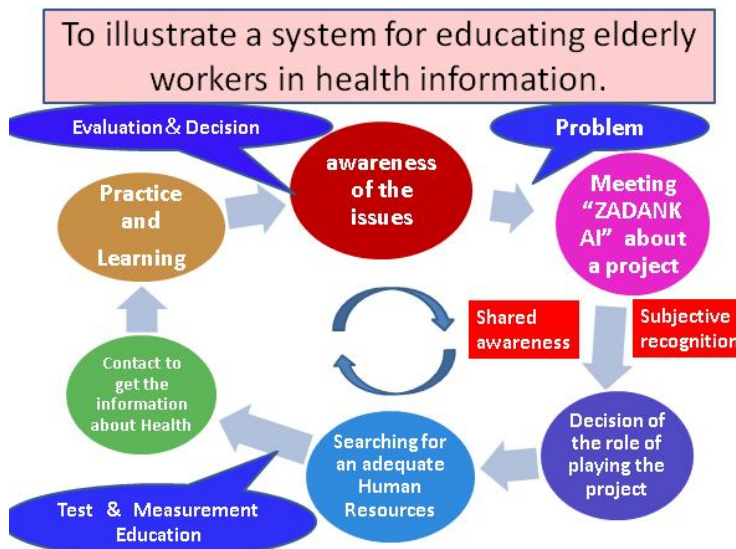

Figure 2. Illustration of a system for educating elderly workers in health information.

The elements that marked the structure were problem awareness, sharing of problems through meetings, role-sharing, search of human resources, handing of health information, learning and practice, assessment of results, and judgment of whether the

cycle repeats or not. The works done by the university are highlighted in the blue balloons. They were problem definition support, health related testing and measurement, education, and result assessment. It is remarkable that the structure was formed almost completely through the initiative of elderly farm workers. Now, we shall see what approaches were taken to address the problem of "stubborn fatigue that remains after rest", which the workers constantly complained. We took note of "rest" as a keyword and focused on the VRT shown here.

The town has approximately 200 elderly residents, and 80, or 20 % of them require nursing care. A total of 30 from the 120 remaining people participated in the project, and 25 % of the participants joined the project at the beginning. The participants were assigned different programs every three months at random. There were three programs: one was a leg motion exercise, another was a placebo breathing exercise, and the last one was a walking exercise. The participants were asked to continue one of these exercises for three months. All participants completed all exercises through a year. For the last three months, they picked up their favorite exercise and continued it. The participants were recruited under the conditions that they were 50 years old or over and lived independently.

MATERIAL AND METHODS
I conducted a survey of older agricultural workers who are working in a city in Ishikawa prefecture where the number of agricultural fatal accidents is the smallest in Japan. Ishikawa prefecture is located north of the center of Japan's mainland. I conducted an experiment as described below in Kasama City which is located in the center of Ishikawa prefecture. This is the area where the university I used to work for is located. It's a small district 900 m away from the center of the city and its population is about 1000 (Figure 3). The population of people aged 65 or over is 217, which is 20 % of the total population. This is very much like the average structure of Japan.

Figure 3. Kasama town in Ishikawa Japan bird view.

This experiment had two purposes. The first was to reveal whether it is possible to establish a structure for local older people to independently maintain their health. The second is to figure out factors to improve their strength in the case of "fatigue they can't get rid of even after taking a rest" they always complain of despite they seem to be relatively fine physically. Here, I shall outline the research contents.

The activity status was investigated in order to study physical inactivity. The functioning of peripheral venous blood vessels was also tested. This test is a measurement of the venous return function with loading, called VRT. An infrared sensor is placed over a superficial vein. The subject is asked to block the flow of blood temporarily by raising and lowering the ankle five times. In this test, we measure how many seconds it takes to return to baseline after blocking. The normal range of VRT is from 30 seconds up to 60 seconds. The result of this test reflects physical inactivity.

We examined the relationship between this test and the amount of physical activity (PA). The amount of physical activity was expressed by the method of converting to calories. On the other hand, a simple method of measuring the presence of physical activity by the time for which it is continued was also used. This method is called PAR. The PAR is expressed as a ratio of the time of activity divided by time of sleep and rest. Many of the subjects were taking 8 hours of sleep. The key is whether or not they were taking 4 hours or more of rest other than sleep. The PAR becomes less than 1.0 when the time of resting becomes greater than 4 hours. It was investigated whether or not there is likely to be physical inactivity accompanied by abnormal VRT when this PAR is less than 1.0.

As an analysis, the odds ratio of the association between the truth or falsity of PAR=1 and the VRT was examined. Similarly, the odds ratio of the association between the execution of placebo and VRT was obtained. Finally, the size of the effect in the PAR=1 group compared to the placebo group was examined.

RESULTS

The results of an analysis using data from the first three months are shown. Full data could be finally obtained from 19 out of 26 subjects. The average values were 26.3 seconds (±15.1) for the VRT and 1.2 for the PAR. The VRT was normal for 5 subjects, which was 25 %. They were of the group whose members increased their PA time by training their knees (Figure 4). For the group with PAR of less than 1, the odds ratio for incidences of VRT abnormality was 12.0 times, 95 % confidence interval 1.05–136.79, greater than that for the group with PAR greater than 1.0. The direct probability is p=0.04. There was a tendency of the average VRT to be higher for the PAR group compared to the Placebo group.

For the group with PAR greater than 1.0, the odds ratio for incidences of VRT abnormality was 0.031 times, 95 % confidence interval 0.02–0.418, compared to the placebo group (Figure 5). The chi-square value for PAR and incidence of VRT abnormality was a direct probability of p=0.23.

PAR * VRT_normal Cross tabulation Count

			VRT_normal		
			Abnornal	Normal	Total
PAR	Except 1		8	1	9
	Within 1		4	6	10
Total			12	7	19

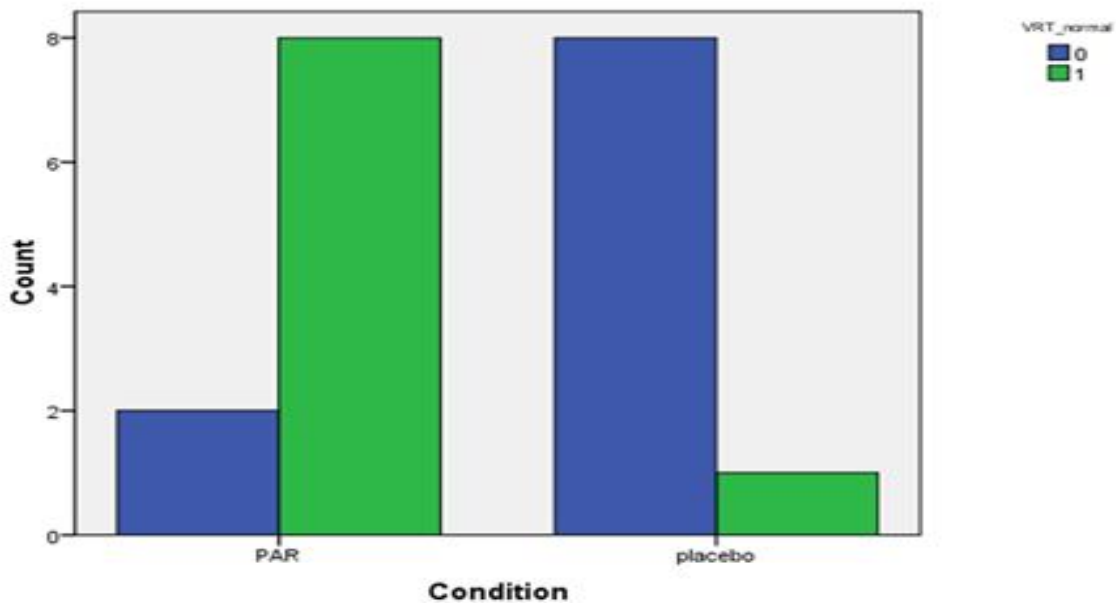**Figure 4. VRT normal cross tabulation count table.**

Figure 5. Normal or abnormal VRT count in each condition, PAR and placebo.

DISCUSSION

The actual status showed that the subjects in this study were taking an average of five hours of sitting rest in addition to eight hours of sleep. In contrast to the case of air travel, there are many reports of increasing incidences of the economy class syndrome with rest periods of eight hours in continuous sitting rest. For the group with PAR=1, the odds ratio for incidences of VRT abnormality was 0.031 times, 95 % confidence interval 0.02–0.418, compared to the placebo group. This shows that it may be possible to reduce the probability of deterioration from a half to about three percent when PAR is greater than 1, compared to the case of activity patterns with a lot of resting time.

In this study, it was considered that the actual content of the resting period was important, that is, that the time driving tractors was excluded from the resting period in their daily lives. This is because, as it is farming work, it is considered to involve a certain amount of physical activity. I would ask persons involved in agriculture to look at a document of the Ministry of Agriculture, Forestry and Fisheries of the Japanese Government. It recommends that a break of fifteen minutes should be taken after two hours of farming work. It is considered that this is the problem which is causing the

workers to report fatigue from which they cannot recover by resting. The intensity of work in operating a tractor is low. It is perhaps closer to resting. There is also the already known problem that in work using tractors, dysfunction of the autonomic nervous system arises due to the Whole Body Vibration, WBV, which a person in the driver's seat is subjected to. When such additional effects are considered, it is easier to understand, as a factor to aggravate the venous return function, the existence of a trick in farm labor. That is, one has the feeling that one is exercising while working, and that the resting period is delaying recovery. In order not to get caught in this trick, one way would be to spend the break with light exercise. If, in addition to these four hours, two fifteen-minute periods were spent fully resting, the PAR would be greater than 1.0. Similarly, the more often the rest according to the recommendation is taken, the more the VRT will show abnormalities. Thus, we consider that, for elderly persons working in farming, it is necessary to provide information about ways of resting depending on the intensity of work. It is important to guide and educate them about active ways of resting by paying attention to the physical element. Such knowledge and information that is acquired by one's own initiative, accompanied by practice, leads to very effective understanding. There are many ways to support the work of the elderly. It can be said that the effectiveness of such support, making use of local organizations and health technology, will be enhanced by combining it with the results of actual verification.

CONCLUSIONS

In the case of the elderly, when sleep and sitting rest are continued for twelve hours or more, that is, when physical activity is less than twelve hours, they may be considered to be in inactivity which can induce stagnation of blood flow that is seen in local insufficiency of exercise. As a recommendation resulting from this study, the advice is that when a feeling of fatigue arises from which it is not possible to recover by resting, in the case that the working time combined with the time of sleep exceeds twelve hours, the break during work should be spent in light exercise rather than rest.

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RELATIONSHIP BETWEEN BODY COMPOSITION AND MOTOR FUNCTION IN COMMUNITY-DWELLING ELDERLY INDIVIDUALS

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ABSTRACT

The purpose of this study was to determine the relationship between body composition and motor function in community-dwelling elderly individuals. The participants were 93 community-dwelling elderly people from Japan, over 65 years of age (42 men and 51 women; age range 65–83 years), who participated in a health-promotion project. Body composition (percentage body fat [%BF] and percentage skeletal muscle [%SM]) were measured by bioelectrical impedance analysis (BIA) using the HBF-362 (Omron Healthcare Co., Japan). Motor functions analyzed included sway path, 1-leg standing time, timed up-and-go test (TUG), and functional reach test (FRT) for balance. The 10-m gait speed for gait function, trunk flexion angle on long-sitting position for flexibility, flexion and extension of the knee joint, and grip strength for muscle power were also determined. Spearman's rank correlation coefficient was calculated to determine the relationship of BMI, %BF, and %SM with motor function outcomes. In men, a significant correlation was found between BMI and trunk flexion angle ($r = 0.403$, $p < 0.01$); between %BF and 1-leg standing time ($r = -0.372$, $p < 0.05$), extension strength of the knee joint ($r = -0.417$, $p < 0.01$), and flexion strength of the knee joint ($r = -0.350$, $p < 0.05$); and between %SM and FRT ($r = 0.539$, $p < 0.01$), TUG ($r = -0.547$, $p < 0.01$), 10-m gait speed ($r = 0.517$, $p < 0.01$), extension strength of the knee joint ($r = 0.579$, $p < 0.01$), and flexion strength of the knee joint ($r = 0.50$, $p < 0.01$). In women, a significant correlation was found between %SM and TUG ($r = -0.410$, $p < 0.01$), 10-m gait speed ($r = -0.354$, $p < 0.05$), extension strength of the knee joint ($r = 0.513$, $p < 0.01$), and flexion strength of the knee joint ($r = 0.428$, $p < 0.01$). These results suggest that overweight elderly men have higher flexibility, obese elderly men have lower leg strength and balance ability, and elderly women with high %SM have high leg strength but lower balancing ability.

Keywords: Body Composition, Elderly Individuals, Motor Function

INTRODUCTION

According to the World Health Organization in 2006, the percentage of the population ≥60 years of age in Japan was 25.6 %, making Japan the nation with the highest proportion of elderly citizens. The ratio of people over 65 years has been progressively increasing, being 10.3 % in 1985, 20.2 % in 2005, and 22.7 % in 2009 (a population of 29,010,000 as determined by the Ministry of Internal Affairs and Communications in 2011). The main cause of the growth in the aging population is declining birth rates and increase in life expectancy due to the progress of medical technology. The rise in the elderly population has resulted in an increase in medical expenses for the elderly, which were approximately 890 billion yen in 1995 and exceeded 1,100 billion yen in 2007. The national medical expenses were approximately 26,900 billion yen in 1995 but exceeded

34 trillion yen in 2007, paralleling the increase in the ratio of elderly people. Thus, the health care of the elderly becomes a social problem due to the escalation of medical costs, which strains the social insurance and pension systems.

Furthermore, the problem of obesity is rising among the elderly population in Japan. The number of obese individuals potentially suffering from the metabolic syndrome in Japan was approximately 19,400,000 in the 40 to 74 year age group in 2006. Statistics show that 60 % of men and 25 % of women in their 60s and 70s have the metabolic syndrome. Visceral fat has been shown to accumulate with advancing age. This, in turn, leads to an increase in the secretion of TNF-α into the blood, which, along with an impaired secretion of adiponectin, induces insulin resistance in skeletal muscles. Adiponectin has anti-atherogenic or vasodepressor effects, which, along with an increase in visceral fat, is thought to play a role in arteriosclerosis. According to the report by Dishman et al (2004), a lesion results from tissue injury to the cells of the endothelium, which can either be due to physical damage from lipoprotein levels or chemical damage from tobacco smoke or high homocysteine levels. Platelets then adhere to the damaged endothelium and release vasoconstrictors and blood clotting factors, resulting in an atheroma and subsequent arteriosclerosis upon accumulation of LDL cholesterol in the lesion (Dishman et al 2004).

Arteriosclerosis is known to reduce healthy life expectancy. In a survey conducted by the Ministry of Health, Labour and Welfare in 2011 to study "Causes of death and morbidity in Japan," malignant neoplasms ranked first, followed by cardiac disease, and cerebrovascular disease. Cardiac disease and cerebrovascular disease caused by arteriosclerosis comprise approximately 30 % of all causes of death (Ministry of Health, Labour and Welfare 2011). Furthermore, cerebrovascular disease is the main factor necessitating nursing care in Japan. Cerebrovascular disease and cardiac disease due mainly to arteriosclerosis-related vascular lesions are responsible for approximately 30 % of patients in need of nursing care. Thus, arteriosclerosis due to obesity is a serious health problem, and obesity in the elderly population needs to be adequately addressed to enable an extension of healthy life expectancy.

The purpose of this study was to determine the relationship between body composition, as measured by commercially available body composition analyzers, and motor function in community-dwelling elderly individuals.

METHODS
PARTICIPANTS
The participants comprised 93 community-dwelling elderly people (42 men and 51 women; age range 65–83 years) who participated in a health-promotion project at Kinjo University from January 2008 to March 2010. Kinjo University, in cooperation with Hakusan City, has implemented a health-promotion project for the purpose of improving exercise function and making positive lifestyle changes in the elderly. The original sample comprised 107 individuals, 14 of whom were excluded on the following exclusion criteria: lack of medical permission to participate in the study; <65 years or ≥85 years of age; inability to support oneself in the standing position; presence of severe dementia, cancer, heart failure, or renal failure, or a pacemaker implant; or lack of sensation in feet or hands. The participants volunteered for the project in response to a public announcement. The research protocol was explained to the participants and informed consent was obtained prior to the commencement of the study.

DESIGN

The body composition of all participants was measured. BMI was calculated using height and body-weight measurements. Percentage body fat (%BF) and percentage skeletal muscle (%SM) were determined using a body composition analyzer based on bioelectrical impedance analysis. Motor function, balance, gait, flexibility, and muscle strength were measured for the duration of the health-promotion project. This cross-sectional study compared the data between the men and women, and evaluated the relationship between body composition and motor function.

MEASUREMENT

The body composition (%BF and %SM) was measured using the body composition analyzer HBF-362 (Omron Healthcare Co., Japan). The body weight, %BF, and %SM were determined with the participants standing barefoot. An assistant kept a constant watch over all subjects during the measurement to prevent falls. Motor functions analyzed included sway path, 1-leg standing time, timed up-and-go test (TUG), and functional reach test (FRT) for balance. The 10-m gait speed for gait function, trunk flexion angle on long-sitting position for flexibility, flexion and extension of the knee joint, and grip strength for muscle power were also determined. Sway path was measured using the stabilograph MatScan (NITTA Co., Japan). Muscle strength was measured using the isokinetic dynamometer Cybex HUMAC NORM CN-77 (CSMi Co., USA).

STATISTICAL ANALYSIS

Spearman's rank correlation coefficient was used to determine the relationship among BMI, %BF, %SM, and motor function outcomes. All analyses were performed separately for men and women. SPSS ver. 17.0 was used for statistical analysis, and the level of statistical significance was set at $p < 0.05$.

RESULTS

The physical characteristics of the participants are shown in Table 1. The mean (SD) value of BMI was 22.9 (2.9) in men and 23.1 (2.8) in women, that of %BF was 26.4% (4.6%) in men and 34.3% (4.3%) in women, and that of %SM was 27.5% (2.1%) in men and 22.8% (2.0%) in women. Motor function data are shown in Table 2.

In men, a significant correlation was found between BMI and trunk flexion angle ($r = 0.403$, $p < 0.01$); %BF and 1-leg standing time ($r = -0.372$, $p < 0.05$), extension strength of the knee joint ($r = -0.417$, $p < 0.01$), and flexion strength of the knee joint ($r = -0.350$, $p < 0.05$); and %SM and FRT ($r = 0.539$, $p < 0.01$), TUG ($r = -0.547$, $p < 0.01$), 10-m gait speed ($r = 0.517$, $p < 0.01$), extension strength of the knee joint ($r = 0.579$, $p < 0.01$), and flexion strength of the knee joint ($r = 0.50$, $p < 0.01$) (Table 3).
In women, a significant correlation was found between %SM and TUG ($r = -0.410$, $p < 0.01$), 10-m gait speed ($r = -0.354$, $p < 0.05$), extension strength of the knee joint ($r = 0.513$, $p < 0.01$), and flexion strength of the knee joint ($r = 0.428$, $p < 0.01$), but not between BMI or %BF and motor function outcomes (Table 4).

DISCUSSION

The subjects were community-dwelling elderly individuals, who were comparatively mobile. In addition, based on their voluntary participation, it appears that many of them were relatively healthy. However, some of them had certain difficulties in their everyday life, including some who had experienced falls and were frail, as compared to the healthy elderly people.

We found a significant correlation between BMI and trunk flexion angle in men. It was suggested that overweight elderly men with a high BMI have high flexibility. We also found a significant correlation between %BF and 1-leg standing time and extension and flexion strength of the knee joint in men, suggesting that obese elderly men with a high %BF have muscle weakness and a depression of the balance function. As reported using data from the cross-sectional Framingham Heart Study, disability in elderly people is not related to skeletal muscle mass but rather to an increase in %BF (Visser et al 1998). Generally, BMI in relation to death rate is a U-shaped curve, with overweight individuals at the lowest point and obese and lean people at approximately the same point. However, the association between BMI and death rate is not seen in elderly people >65 years of age (Stevens 1998; Jee 2006). In our study, we did not find a significant association between BMI and disability, but obese men with a high %BF had more disability as compared to that of non-obese men, suggesting that body fat mass or %BF may be a better indicator of health as compared to BMI.

In women, we did not find a significant correlation between BMI or %BF and motor function. In the Japanese population, %BF decreases gradually after 50 years of age in men and increases in women after 50 years of age but decreases slightly after 65 years of age. In addition, there is a reduction in fat-free mass in both men and women after 50 years, which is more severe in women (Komiya 1997). Because the change in body composition is more severe in women, the difference in the loss of exercise function may not be very apparent in obese vs. non-obese women. However, in the elderly women, we found a negative correlation between high %SM and TUG as well as 10-m gait speed, and a positive correlation between TUG and lower-limb muscle strength. The TUG test measures, in seconds, the time a person takes to stand up from a chair, walk 3 m ahead, turn, walk back to the chair, and sit down. This examination is useful for measuring walking ability and dynamic balance. Our results suggest that elderly women with a high %SM have high gait function and dynamic balance ability. In addition, %BF generally increases in elderly women, but those with a higher %SM would have superior walking ability.

Further research to elucidate the correlation between exercise function and body composition is required. We suggest that events like a class reunion may provide a good opportunity for testing and follow-up.

CONCLUSIONS
The results of this study suggest that overweight elderly men have higher flexibility, obese elderly men have lower leg strength and balancing ability, and elderly women with a high %SM have high leg strength but lower balancing ability. We are currently performing this investigation on a greater number of participants. A further examination to study differences in the athletic ability between obese and non-obese individuals needs to be conducted.

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Table 1. Characteristics of participants.

Mean ± SD

	Men (n = 42)	Women (n = 51)
Age (y)	71 ± 4	71 ± 4
Height (cm)	163.2 ± 5.7	152.1 ± 5.4
Weight (kg)	63.1 ± 9.0	53.8 ± 7.1
BMI (kg/m^2)	23.7 ± 3.0	23.2 ± 2.8

Table 2. Motor function data.

	Men		Women	
	Average	SD	Average	SD
Grip strength (kg)	34.1000	6.60617	22.8489	4.87086
FRT (mm)	264.585	72.7568	255.600	62.8701
One-leg standing time (s)	32.6652	22.35734	34.0796	24.67095
Trunk flexion angle (cm)	17.2293	12.49432	27.6327	12.00627
TUG (s)	6.5068	1.93104	6.4754	.90031
10-m gait speed (s)	4.9820	1.69656	4.9722	.90950
Extension strength of knee joint (Nm)	100.3750	33.70816	66.7347	17.53779
Flexion strength of knee joint (Nm)	59.8500	23.28150	38.1224	13.10476
Sway path (cm)	40.7840	12.79372	40.0982	14.87259

Table 3. Correlation between body composition and motor function in men.

Outcomes		Correlation coefficient	p-value
BMI	Trunk flexion angle	r □ 0.403	$p < 0.01$
%BF	One-leg standing time	r □ −0.372	$p < 0.05$
	Extension strength of the knee joint	r □ −0.417	$p < 0.01$
	Flexion strength of the knee joint	r = −0.350	$p < 0.05$
%SM	FRT	r = 0.539	$p < 0.01$
	TUG	r = −0.547	$p < 0.01$
	10-m gait speed	r = 0.517	$p < 0.01$
	Extension strength of the knee joint	r = 0.579	$p < 0.01$
	Flexion strength of the knee joint	r = 0.50	$p < 0.01$

Table 4. Correlation between body composition and motor function in women.

Outcomes		Correlation coefficient	p-value
%SM	TUG	r = −0.410	$p < 0.01$
	10-m gait speed	r = −0.354	$p < 0.05$
	Extension strength of the knee joint	r = 0.513	$p < 0.01$
	Flexion strength of the knee joint	r = 0.428	$p < 0.01$

VOLUNTEERING AND SOCIAL CAPITAL IN ELDERLY CARE

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ABSTRACT
The changing age structure in affluent countries demands restructuring of elderly care services in order to be able to meet the challenges of increasing care needs in a cost-effective way. Volunteer work and informal care given by relatives have been sources to support formally organized social and health care services, whether provided by the public, private or third sector. Sometimes volunteers are seen as a threat, sometimes as a resource from the point of view of professionals working in elderly care. Volunteering in elderly care needs management as well. How can volunteering be a well-managed resource and enhance social capital? The article analyses the roles and relationship models between professional workers and volunteers in elderly care services. In the article, an analytical model of the possible relationship is described and discussed and the model is then used in an empirical study using case examples from service housing for the elderly. The empirical material is two-fold: One set of material is collected via a self-evaluation tool developed by the project "The significance of intellectual capital" which was carried out by Jamari Jylli Foundation and funded by the Slot Machine Association of Finland. One part of the self-evaluative tool was volunteering work and management of volunteering. This data is used to analyse the management structures of volunteering in the 40 elderly care service providers who used the self-evaluative tool. The second data set is formed by interviews with staff members in three different elderly care organizations providing sheltered housing or residential care and using volunteers as part of the human resources. The main research questions are a) what kind of management tools are used with volunteers in elderly care, b) what are the challenges in the management of volunteer workers and c) how can volunteering enhance social capital within the organization? The results show that volunteering can be an asset in both enhancing social capital within the work organization and the community but only if it is managed, clear roles are set and the volunteer management is based on collaborative approach. Social capital is something which can be enhanced in elderly care and ought to be promoted. Putting more focus on the promotion of social capital in elderly care can be a development tool for not only better quality of care but also well-being of the personnel.

Key words: Social capital, Volunteer work, Service housing for the elderly, Management of volunteers

INTRODUCTION
In affluent societies elderly care is no longer the sole responsibility of family members, relatives or civil society but an organized service including non-residential and residential care provided by a specially trained staff. The modalities by which these services are organized vary from country to country depending on the historically, socio-culturally and economically based welfare model. The often used, already somewhat outdated theory of welfare regimes by Esping-Andersen from 1989 (Esping-Andersen 1989) divides the welfare regimes into three main types: liberal (Anglo-American),

conservative (Middle-European) and socio-democratic (Nordic) model. In the Nordic model the right for services when in need is based on universalism and equal rights for care regardless of such things as income level or location. The quality standards in elderly care ought to be the same for all. On the contrary, in the liberal model, e.g. in USA, care services vary in quality and quantity, depending on financial possibilities to buy services or, if being with limited means, having to rely on public services, services run by NGOs or volunteer work organizations. In the Middle European model NGOs and, for example, religious organizations have a considerable role in the provision of elderly services in addition to those of private care foundations or public sector.

The transition of the Nordic model has taken place since 1980s towards the welfare mix model and the new public management (NPM) system, where the three e's: effectiveness, efficiency and economy are the key criteria. Presently in Finland, a combination of informal care provided by family members, publicly arranged services and services provided by private sector and NGOs form a web of service provision managed by the public sector, municipalities, which under the Social Welfare Act are liable to arrange services for their residents when in need. The modality how the services are provided and in which extent the purchaser-provider model is used depends on the municipality. In big cities, like in Helsinki or Tampere, elderly care services are provided via different service providers. For example, the city of Tampere purchases all sheltered accommodation for the elderly from the private sector (including NGOs) via a public procurement system. Without going into the discussion whether the change from public services to a more mixed model of service provision is good or bad, the focus in this article is on the role and management of volunteering in elderly care as part of the services.

Volunteering used to be something "belonging to the old world of philanthropy". But oddly enough, volunteering did not die out, not even in Finland. Especially since the scaling down of service provision and introduction of service fees for e.g. home care since the early 1990s with the economic recession and budget cuts, volunteering has emerged and revived, as has the role of non-governmental organizations. Voluntary activities once again became a core element of Finnish society and attention was being paid to the role of voluntary organizations in creating employment as well (Study on volunteering in European Union, 2011).

There is no official data available on the exact number of volunteers in Finland. Different surveys and studies have indicated that the number of volunteers in Finland varies around 35–37 % of the adult population, meaning over 1 million people. Research from 2002 indicated that 62 % of the volunteers work through organizations while the rest volunteer in a more informal way (Yeung 2002).

In elderly care volunteering has always been part of the religious organizations' activities. The new trend in volunteering for and with elderly emerged in the late 1980s. Some milestones in the process were the establishment of Mummon Kammari (Granny's Corner) by the Tampere Lutheran Congregation and volunteer campaigning by Helsinki City Mission. During the 1980s volunteering in social and health care services, also in elderly care, was not always welcomed. The professionals working in the field raised the issue of employment and payment: using volunteers was seen not only as an asset but also as a threat. Personally I remember a heated discussion in our vocational institute on whether we should support volunteering of our students in social service organizations or establish our "student enterprises" for practical training purposes. Part of the staff members thought that it would be both unethical as well as destructive for the status of the paid staff.

The attitudes since then have changed, which can be seen interlinking with the change in the welfare model of today. Volunteers are used in various elderly care services. They are provided with training and volunteer work is coordinated by a trained and paid staff member. Volunteer work can be part of the curriculum in vocational and higher education and students can provide different kinds of services as either part of their student enterprises or under teaching and learning units run by educational institutes. Although this is the case, the management of volunteer work and volunteering is not much studied and taught as a specialized management skill. The management of volunteer work is not the same as management of staff members but has special requirements and features which need to be taken into account. Management models and role of volunteers in elderly care settings is the first topic of this article.

The second topic in this article is how volunteering can be supportive for enhancing social capital in elderly care settings. Social capital is nowadays a popular and widely used concept. The concept is briefly defined and its relation to the concept of intellectual capital is compared. How volunteering and enhancing social capital can be supported is briefly discussed.

The three main research questions are: a) What kind of management tools are used with volunteers in elderly care, b) What are the challenges in the management of volunteer workers and c) How can volunteering enhance social capital within the organization?

VOLUNTEERING IN ELDERLY CARE

Year 2011 is the European Year of Voluntary Activities which has marked several activities run within EU countries to enhance volunteering and active citizenship.

There is no generally accepted definition for volunteering and, for example, different European countries define it in different ways.

The European Council has defined volunteering as referring to "all types of voluntary activity, whether formal, non-formal or informal which are undertaken of a person's own free will, choice and motivation, and is without concern for financial gain." Furthermore it states that "voluntary activities do not replace professional, paid employment opportunities but add value to society" (European council 2009).

In the definition above there is a difference between the types of volunteering: formal, non-formal and informal. Formal volunteering refers for voluntary activities that take place in organized structures. The informal and non-formal volunteering are often used as synonyms and refer to unorganized, spontaneous helping. (Angermann and Sitterman 2010)

In Finland there is no legal definition of volunteering and a range of different definitions are being used. A leading voluntary sector researcher, Yeung (2002) defines volunteering as "unpaid activity from free will for the benefit of others, which often takes place in an organised setting". Volunteering agency KansalaisAreena has defined volunteering as "all activity carried out for the public good, which is based on civic movement and voluntary action and is not paid for".

The key words uniting most definitions are: unpaid activity, for the benefit of others and action taken from free will. Sometimes organised volunteering is differentiated from informal activities like neighbourly help (Volunteering in the European Union 2010).

According to a recent study, about 22–23 % of Europeans are involved in volunteering. What is quite amazing is that the top three countries in volunteering are Denmark, Finland and Sweden, where on average about 45 % of adults participate in voluntary and charitable activities (McCloughan et al 2011). This data also includes informal volunteering, not only volunteering through organizations.

In elderly care volunteering appears in different forms: as spontaneous help for relatives or neighbours without organized structures or coordination (informal), as volunteering for an organization or an association with special roles and tasks, such as Red Cross, within religious organizations such as City Missions, within not-for-profit service providers or within a public institute or service (formal) or as a member or an activist in a civic movement or NGO e.g. for campaigning or advocating for a certain cause (non-formal).

In this article the focus is on formal volunteering in elderly care. This means that informal care given by family members (which in Finnish elderly care can also be supported by a financial benefit for the carer) or spontaneous help without an organized management or coordination mechanism is excluded. The main focus is on formal volunteering and the management of formal volunteering in elderly care.

Volunteers perform different kind of roles and functions in elderly care. The main areas of activities are, firstly, creating a different kind of "social spaces" for elderly that offer various forums and activities for social contacts and networking. These include associations and clubs, open community houses and places, where to meet others and take part in various recreational, cultural, educational or rehabilitative activities. Some of these are run by volunteers, in some the work is shared between professional staff and volunteers. Typical of these is that the elderly themselves are active in the organization and management of the activities as well. The role of "a volunteer" and "a client" can thus be one and the same. At its best, volunteering in elderly care is actually the care itself.

Another type of volunteering in elderly care is peer support groups for persons such as informal carers, widowed men or women, carers or relatives of elderly suffering from memory diseases or elderly living alone. Peer support (individual), including telephone helplines and peer support groups are usually run by an organization but can be lead either by a trained volunteer or a professional worker.

The third type of volunteering in elderly care contains the various forms of assisting work provided by volunteers in formal elderly care services, e.g. helping in feeding, having a stroll outside, reading papers, discussing with clients, organizing events or some hobby groups. In this kind of volunteering the professional workers and volunteers – often trained – have special defined roles and division of work. Figure 1 illustrates the different objectives and functions volunteers can have in elderly care.

The roles of volunteers can thus be "activists", "self-helpers" or "assistants". In one the organizations interviewed for this article, the last group of volunteer helpers were called "friends". These names try to capture the role of volunteers in relation to professional staff and the role towards the service user as well. When volunteers are working as "assistants" in collaboration with professional workers, the role is different than when volunteering has the role of a self-help group.
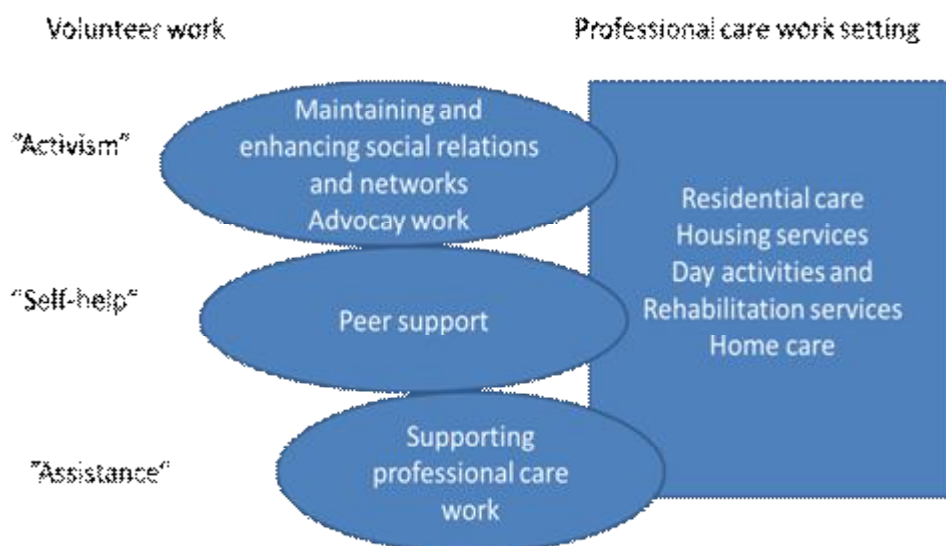
Figure 1. The varied roles of volunteer work in elderly care.

Non-governmental organizations organize and manage volunteer work in various quantities and ways, also in elderly care. Typically the situation in Finnish elderly care is that volunteers are not so much used in public or private services but mostly in services run by NGOs (over 90 %). The lack of "helping hands" in elderly care has also created new cooperative models between public services and volunteer work organizers. For example, in the public residential home "Koukkuniemi" volunteer workers are organized via Mummon Kammari, which provides training for potential volunteer helpers and takes care of contracting them for "Koukkuniemi". In this example, volunteers are used as "assistants" in formal residential care services.

VOLUNTEERING AND SOCIAL CAPITAL – IS THERE A RELATIONSHIP?
What kind of value does volunteering bring to elderly care? The value of volunteering can be counted, of course, in money. There are no special estimates of how much is the value of volunteering in elderly care in the case of Finland, which might be an interesting figure to be calculated. Besides money, the value for volunteering in elderly care benefits both the clients and staff members in elderly care as well as the volunteers themselves, who are also often elderly. Volunteering by the elderly, not only in elderly care, can be a preventive measure for keeping up functional ability, enjoyment in life and social contacts.

Elderly people are often seen only as the beneficiaries of voluntary activities. The role of voluntary service is likely to become increasingly important in the context of cuts in public welfare services. With volunteering, social contacts and networks can be maintained and enhanced both internally in a service organization as well as externally between the service organization and the surrounding community. Volunteering should not be seen only in a narrow way, looking at the "help" it provides for the elderly and staff members, but also in a more broader way of enhancing social capital and community spirit within the organization as well as with the organization and the community.

According to Putnam, social capital refers to connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them. (Putnam 2000). Social capital is an integral part of the organization's intellectual capital.

But social capital is owned jointly by partners in the relationship, in contrast to financial and human capital, which are the property of an individual or a firm. Social capital is embedded in the positions of contacts the organization reaches through its social networks (Pennings and Lee 1998). Like Coleman (1988) said, social capital is situated within social structures. It consists of obligations and reciprocal expectations, information flows and norms. The key is the expectation for reciprocity; when I help you now, you help me when I need it. Social capital is based on this system of trust (Ruuskanen 2001).

In a service like elderly care, where the work is context-sensitive and individual-centred, it can be modelled as a standard work process only to a limited extent. The elements of trust and collaboration between service users and workers, as well as trust between different staff members, are key elements of good care. The quality of service delivery outputs are closely coupled with reputation and image as well, which again are connected to collaborative relations between service partners and the surrounding community. Thus enhancing social capital in an organization by building up and maintaining the elements of shared values, objectives and mutual trust is essential.

How is this connected to volunteering? Cannot social capital be enhanced without it? Of course, it can. But enhancing volunteering in elderly care can be a tool for creating a vivid relationship between an elderly care service (referring here especially to sheltered accommodation or residential care settings) and the surrounding community. The institute can then "open up" and benefit from the activity of community members who in their turn might become service users themselves in future.

COLLECTION OF DATA

The empirical data about the use of volunteers and management of volunteers is based on the data collected under Jalmari Jylli Foundation's project "The Significance of Intellectual Capital in Elderly Care" funded by the Finnish Slot Machine Association between 2008–2010. The partners in the project were NHG Audit Ltd., Tampere University of Technology, Tampere University of Applied Sciences, Rehabilitation Centre Apila, and the Helsinki City Mission. The project developed and tested a self-evaluation tool for measuring intellectual capital in elderly care. The evaluation tool, Apo.työkaluptika 1.0, was tested among 40 non-profit organizations within elderly care services. (more about the theoretical base of the project in Sillanpää et al 2010). In addition to this data, some semi-structured interviews were done specifically concerning the value and management of volunteers in sheltered accommodation or residential services for the elderly. Both empirical materials are combined in the analysis to explore the following questions:

METHODS

Under the project "The Significance of Intellectual Capital" led by Jalmari Jylli Foundation from Ikaalinen, during 2008–2010, a self-evaluation tool for measuring intellectual capital was developed and tested. The term intellectual capital refers to an organization's non-physical sources of value. Intellectual capital is often divided into three main sections:

1. Human capital (including competences and knowledge)
2. Relational capital (including customer relationships and imago) and
3. Structural capital (including processes and documented information (Sillanpää et al 2010).

During the project the important elements of intellectual capital in not-for-profit elderly care organizations were defined in co-operative development work with three different pilot organizations, Jyllinkodit, Rehabilitation Centre Apila and the Helsinki City Mission. Based on the development process the "Apo.työkaluptika 1.0", self-evaluation tool was designed for the use of elderly care organizations. The tool includes the field of strategic and operational management of the organization and subfields of process management in sheltered accommodation, rehabilitation services and volunteer work. The "Apo.työkaluptika 1.0" was pilot-tested during spring 2010 over a period of three months with seven elderly care organizations. The experiences and comments collected were used to finalize the tool which was then tested with 40 service providers in elderly care.

The numbers of responding organizations representing different fields out of the total of 40 were as follows: strategic and operation management (37), sheltered accommodation (23), rehabilitation services (15) and volunteer work management (16). In the processing of the responses from the organizations the aim was both to identify the strengths and weaknesses of the organizations and to compare them to others. The aim of the tool is to support the management of the organization to identify development areas by having a benchmark of their own situation compared to others.

In this article, the answers to the section of volunteer work management are analyzed and compared with each other. The semi-structural interviews were done with five different staff members working in three non-governmental elderly care organizations offering sheltered accommodation or residential care for the elderly. The questions dealt with their views on the value of volunteer work, the challenges in the management and coordination of volunteers and how did staff members see the relationship between volunteer work and social capital.

RESULTS

This chapter presents the main results combining the data from the self-evaluative tool as well as interviews.

The self-evaluative tool "Apo.työkaluptika 1.0" contains 27 statements regarding volunteer work management in elderly care services. The statements include fields of

- strategic and operational planning of volunteer work and using volunteers as part of human resources (8 statements: statement numbers 1 to 8),
- implementation of volunteer work management (13 statements: statement numbers 9 to 21),
- documentation, evaluation and development of volunteer work (6 statements: statement numbers 22 to 27).

The statements of volunteer work were answered by 16 different organizations. In the following the medium values (scale values varied between 0 and 100) are presented. Each statement was given a value based on both its present status and its general importance in volunteer work management. In Figures 2 to 4 only the values indicating the present situation are given. The interviews were analyzed based on themes under each of the above mentioned subfields.

STRATEGIC AND OPERATIONAL PLANNING OF VOLUNTEER WORK

The role of volunteers is seen as "supporters" and "helpers". All the interviewees stressed that volunteers give something "extra" which otherwise could not be provided. The "extra" is especially within psycho-social care. No longer are volunteers seen as a threat by professional workers, rather as a "relief".

> *"The volunteers are friends. They do what friends would do: arrange sing-songs, discuss, take out…" (Staff member B from sheltered accommodation A)*
>
> *"I see the role of volunteer workers as really important. Care work and nursing belongs to professionals. Volunteers are like friends. In our service plans we are liable to give certain services but there are limits to what is bought from us. By volunteer work residents get good extra service for well-being…"(Staff member A from sheltered accommodation A)*
>
> *"The value of volunteer work cannot be measured by money. The value is in psycho-social support. Without volunteer work the service would be like a cake without the cream on top. In hospice care volunteer work is an essential part." (Staff member from a hospice)*
>
> *"Our volunteers bring more warmth to our service. They do not do the work of professionals, but bring more "presence", creativity, and respond to the immediate needs of the clients." (Staff member B from sheltered accommodation B)*
>
> *"Volunteers are important to us. We try to treat them as well as we can. Volunteer workers are a relief to us (professional workers)." (Staff member A from sheltered accommodation B)*

But volunteer work needs management as well. It is not something that can just be announced like "come to volunteer to us" and then left like that. The self-evaluative tool showed that in many organizations who responded, volunteer work is a planned and managed activity (Figure 2).
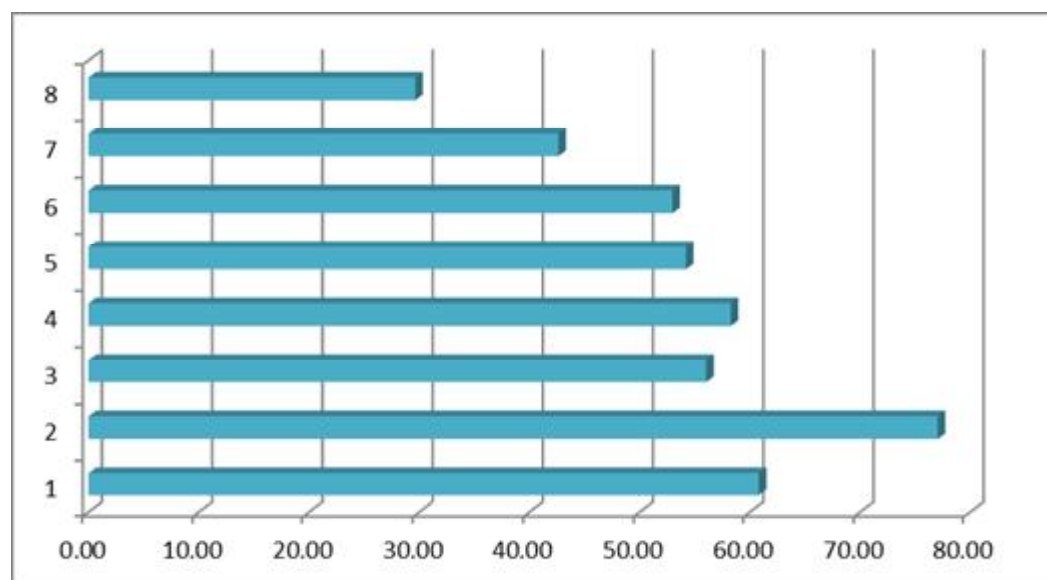

Figure 2. Strategic and operational planning of volunteer work (means, n=16).

Statements:

1. Volunteer work is based on planned and written modality (strategy, values, tasks, responsibilities, ethics…)
2. Assigned coordinator(s) is(are) responsible for volunteer work and volunteers

3. There is a set infrastructure to support volunteering (space, equipment, communication channels)
4. The roles and responsibilities of volunteers and professional staff are described
5. The recruitment process of volunteers follows a set system
6. The education process and its contents are defined and described
7. Competence evaluation concerns both volunteers and staff members
8. Social media is used in the organization of volunteering

Most important things in the management of volunteer work were summarized as planning, coordination and clear role and work division. The following quotes by staff members describe these more in detail:

"It is most important that volunteer work has to be organized and that it has its own coordinator. Coordination does not happen by itself. The coordinator has to be one of the staff members who knows the house rules.
Secondly, there has to be clear definition of what the volunteers are doing and what not – no learning by doing here.
Thirdly, the volunteers need to be supported by training, by work counseling and by organizing some recreational activities." (Staff member from a hospice)
"Volunteer work has to be planned….In our organization volunteer helpers, friends, as we call them, are taken into consideration already in the care planning phase. For instance, when having an initial care plan session, we plan the activities done by nurses, but also what could be the role of a volunteer worker…" (Staff member A from sheltered accommodation A)
"It creates problems if the volunteers do not know their role, and also the staff members need to know it" (Staff member B from sheltered accommodation A).
Planning and management of volunteer work is not "a one-off exercise", it needs upkeep and also having volunteer workers in an organization needs to be a shared endeavour.

"It is really important that volunteer work is planned ahead, we do it yearly. We have coordinators who are in charge of volunteer workers but it is still not enough. The group home personnel also need to carry responsibility for supporting volunteers and making them feeling welcome." (Staff member A from sheltered accommodation A)

According to the self-evaluative tool, most organizations have a separate coordinator for volunteering management and many also answered having a set policy and defined roles and responsibilities for volunteers and a system for training volunteers. Training is essential in the volunteer work management as well. The importance of knowing your volunteers as well as staff members was stressed. One interviewee expressed this as follows:

"Organization of volunteer work needs also people skills. You need to know your volunteers and their needs. Likewise, you need to know the organization's needs. Otherwise volunteering might start to live its own life…" (Staff member from a hospice)

The new method of organizing and managing volunteer work via social media was used very seldom according to the self-evaluative tool.

Operational management of volunteering and volunteer workers

At the operational level, things such as mandatory induction training, working guidelines and confidentiality issues, as well as some work counseling and recreational activities for volunteers are estimated mostly to be at a fairly good level (Figure 3).
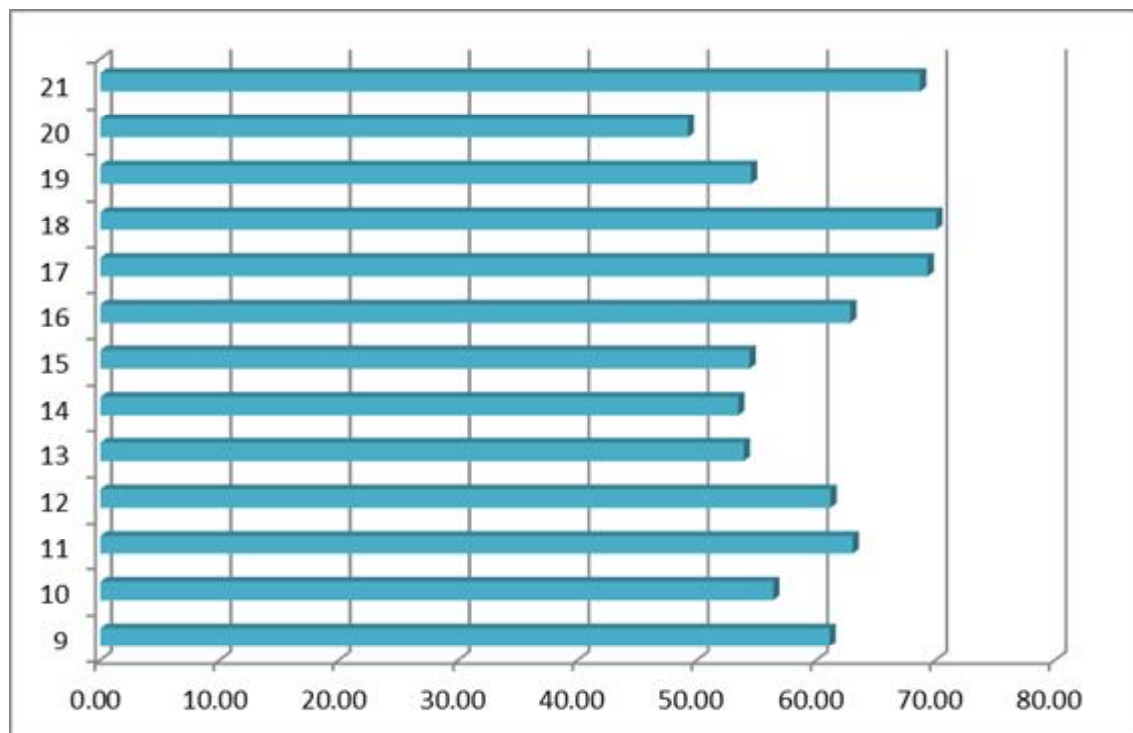

Figure 3. Operational management of volunteer workers (means, n=16).

Statements:
9. The volunteers are required to have basic induction training for volunteering
10. Further training options are offered for volunteers
11. Work counseling is organized for volunteers
12. Volunteer work has written guidelines
13. The work volunteers are doing is documented
14. Training of volunteers includes information on how to behave in challenging or threatening situations
15. Communication skills are included in the training for volunteers
16. Sharing of experiences is offered for volunteers
17. Recreational activities for volunteers are offered
18. Volunteering is supported by network structures and partnerships
19. The principles of communication with volunteers are set
20. The objectives of volunteering are defined
21. Confidentiality regulations are defined

Basic education for volunteers (shorter or longer) seems to be quite a regular procedure. The need for initial guidance and support is acknowledged. Confidentiality and general guidelines of work are mostly set clearly in writing.

"Training is important: Volunteers need to know the house and the residents. All volunteers take part in initial training which also contains the confidentiality rules. In

the beginning volunteers need more guidance. For example, a more experienced volunteer can support at first". (Staff member A from sheltered accommodation B)
"The support needs to be near at hand. Support and counselling are needed…. New volunteers do not know the residents so well and can be afraid to do things; they need guidance on what you can do with a particular person. Also later on, when the person becomes frailer, they might need some ideas of what kind of activities to do then… Even communication with residents can be difficult. Volunteers need work counselling in a way. It might be that a person is behaving oddly and the volunteer might feel badly about it…it is important to provide support so that he/she does not drop off. "(Staff member B from sheltered accommodation A)

Creating community spirit and feeling of a community among volunteers is seen as an important part of management.

"Volunteer workers meet together and form a community of their own. They also become part of our working community, especially those who work with us for a longer period of time, most of them do so." (Staff member A from sheltered housing B)
"It would be really important that the volunteers, friends, are supported as well. It cannot be expected that they always have their own initiatives. There needs to be support. Welcoming them (to group homes) is important. That everyone understands that the volunteers are an important extra value." (Staff member A from sheltered accommodation A)

Volunteers in elderly care are an extra human resource which needs human resource management like any other group. The challenge is that volunteers are volunteers. They can only be managed by motivation and immaterial incentives, which are provided by enhancing the feeling of being loved, being part of the community and being a valuable asset.

"Volunteers participate in the service out of their own will, so 'management' is often challenging. Occasionally there enter some very strong personalities whose actions are not always suitable for our service users. It needs a lot of diplomatic skills to provide guidance for volunteers for the 'right track' without offending him/her… The challenge is to commit volunteers to the activities and, on the other hand, to listen to their wishes. The role of a staff member is also to be a motivator and an inspirer." (Staff member B from sheltered accommodation B)

EVALUATION AND DEVELOPMENT OF VOLUNTEER WORK
The last subfield in the self-evaluation tool was evaluation and development which received the weakest assessments of all the statements. The collection of feedback and its systematic use are not yet well-developed in most of the respondents' organizations, or at least this was their self-evaluation (Figure 4).
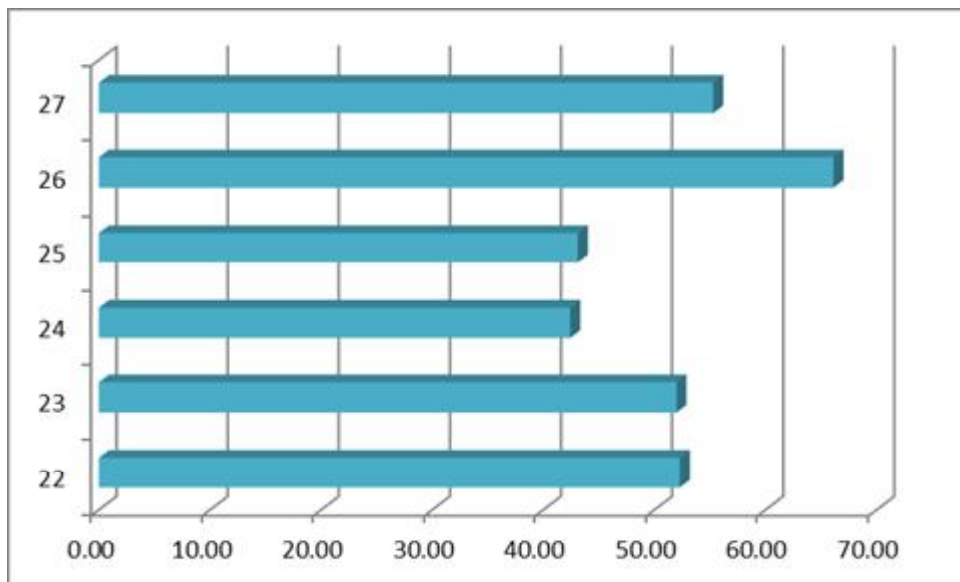
Figure 4. Evaluation and development of volunteer work (means, n=16).

Statements:
22. Regular feedback from volunteers is collected and analyzed
23. Regular feedback from persons receiving volunteer help is collected and analyzed
24. A system for evaluating the quantity and productivity of volunteer work is created
25. A systematic procedure for evaluating the results of volunteering exists
26. Volunteers' initiative is supported
27. The feedback results are systematically used

The self-evaluation tool is, of course, self-evaluation and it does not really measure objectively how volunteering work is managed in practice. However, the fairly good overall results to most of the statements and also the fact that most of the statements were also regarded to be important, shows that the management of volunteers in elderly care is being understood as part of leadership and working in partnerships. One of the interviewees expressed this as follows:

"I think that volunteer work is part of the work alongside paid work – it is not only informal care. Personally I am like running a small business here, 'playing to be a leader'. There are same elements here as in management in general. … The challenge is that volunteer work is based on voluntary will and motivation. You can always refuse to work. Another issue is that most volunteers are elderly themselves (out of 100 volunteers 70 are over 60 yrs. old). Commitment is important. The one who is managing volunteers needs to be enthusiastic of the work him/herself. "(Staff member from a hospice)

VOLUNTEERS AS PART OF SOCIAL CAPITAL AND IMAGO
The self-evaluative tool did not measure social capital as such. The relationship between volunteer work and social capital was asked in the interviews and all answers stated that there is a link between the two. The volunteer work was seen

"as a support for the community of practice in the way that both service users and staff members are more relaxed and less stressed – service users because they do not require so much attention (from workers) and workers because they do not have

to tear themselves between all things and places." (Staff member B from sheltered accommodation B)

"There is a meaning (volunteer work's effect on social capital) – both ways. Our (organization's) social capital increases when we have volunteers and collaborate with them with shared objectives. The residents also benefit. They gain more social contacts; many of them have really few daily contacts. Many times we think about the well-being of a resident only regarding physical, psychological and health aspects – but often the social field is forgotten. Volunteer work increases social well-being, I feel it is important." (Staff member A from sheltered accommodation A)

"The volunteers form a community; they are also our clients, as part of our relationship network. … Social capital appears in social atmosphere, enhances opportunities for social contacts." (Staff member B from sheltered accommodation A)

"Volunteers bring their own view to the working community and are part of us. They also create a home like feeling in the hospice. The hospice spirit is to do good for another person; it is a circle of good which is created here" (Staff member from a hospice)

Volunteer work when being an organized and managed resource in a formal service, with clear defined roles, seems to be an asset for volunteers, staff members and service users. Volunteers are seen as an extra human resource for enhancing well-being which otherwise might be difficult to provide. When thinking about the recruitment problems in elderly care and the increase in service needs in future, we will need volunteers more and more. For service organizations establishing a well-managed volunteer workers' circle is also an option to build up a good image of the service.

"Volunteers are also our own measure for atmosphere. If we have a bad atmosphere and doors are always closed, who would like to come and volunteer here". (Staff member B from sheltered accommodation A)

"Reputation and image: there is a really big meaning there. We always tell about the number of our volunteer workers…It tells a lot about our organization that we have a lot of volunteers. I would claim that in public we are known because of our volunteer work" (Staff member A from sheltered accommodation B)

"Volunteers are the grapevine. They have a big meaning for imago and reputation" (Staff member from a hospice)

One of the interviewees stated that the attitudes have changed. Volunteer work is now more understood as based on the rights and wishes of the volunteer.

"It is a kind of a civil right that a person can affect the well-being of another person at the grass root level (Staff member B from sheltered accommodation B).

In the development of elderly care, volunteer work, should be taken into account as part of the service structure and as part of building up a good image and a circle of enhancing well-being in elderly care. Volunteer work is no longer, and should no longer be seen as something opposite to professional work, but something additional, "cream on top of a cake".

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SOCIAL PEDAGOGICAL HORSE ACTIVITY WITH DEMENTED PEOPLE

Elina Lukumies

Old people's house, Nummi-Pusula, Finland

INTRODUCTION
In my work as a practical nurse in old an people's home with seriously demented people, I daily come across with residents with difficult behavioral problems like aggressiveness, apathy, anxiety and perambulation.

It is known that medication does not always work with these behavioral symptoms, it only diminishes the patients' level of activity and makes them like zombies, that is, they become completely helpless and need much more care. Demented people have seldom any sense of illness. When they are treated like sick people, they feel insulted and they may become aggressive.

That is why all kinds of non-pharmacological treatments should be seriously tried. This would help both the residents and the nurses. The life history of the patient must be carefully studied to find the topics where positive memory traces can be found. When the patient's life history is known, it is easier to find those activities which help them to enjoy their life in spite of their illnesses. This would also diminish the workload of the staff.

Research confirms that the presence of animals has many positive influences on people's well-being. Besides this, animals teach us to draw our attention to non-verbal communication – eye contact, touch, personal space requirements, tone of voice and so on. And most of all – animals teach us living in a moment, which is a very important skill for those who share life with demented people, like nurses.

Now let me present you one non-drug treatment, which is based on a social pedagogical way of thinking. Social pedagogical horse activity is often used to prevent the marginalization of young people. They are involved in taking care of horses and working with the staff in the stable. With special target groups, it is most important that the stable environment is safe and the staff is well trained.

SUBJECTS
I chose two residents for my case study (man A and man B) and three nurses of which I was one.

Man A:
- in his sixties, worked in agriculture and forestry, children
- strong connection with nature, but no previous experience with horses
- frontotemporal degeneration
- complete loss of speech in 2008
- transferred to our ward in 2009, several previous wards, no communication, no eye-
  contact
- heavy medication
- his biggest problem is passivity

Man B:
- in his eighties, worked in lumber industry, children
- positive experiences with horses in his youth
- undefined dementia, transferred to our ward in 2007 from his home
- speech unclear
- aggressiveness in caring situations
- heavy medication

Nurses:

Nurses have from 8 to 10 years of working experience with demented people but little experience with horses except for me. They belong to the permanent staff and are personal nurses of man B. I am the personal nurse of man A.

ACTIVATION METHOD

We visited a small countryside stable two times in 2010. This stable offers professional horse carriage driving and riding therapy. Both times we had a horse carriage drive. In summer 2010 a therapy horse visited our ward. In summer 2011 the owner of the stable visited our ward with one of his horses. We had a horse carriage drive. Between horse visits we activated both men with horse magazines, memorizing our horse stable visits by photographs and watching horse videos.

RESULTS. WHAT HAPPENED DURING AND AFTER THIS EXPERIMENT?

The main results: both men became more active. The effect was more intensive after they had seen a horse and touched it. In stable environment and soon after the visit, Man B spoke more often and with full sentences instead of his earlier single words. Both men behaved very well. They came out of the car without any signs of anxiety, for example without clinging to the car. We, the two nurses, and the residents walked around the farm together without any constraint. Man B was concerned about his nurse's wellbeing: the weather was rather cold; he covered her head with the hood of her coat. This new way of behaving, which did not appear in the ward, made an impression on his nurse. He was also worried about the stable cat: he turned back and opened the door for the cat.

According to man B's personal nurse, they often memorize these horse meetings, which has created a sense of friendship and makes daily routines easier. Pictures and decorations of horses are associated with positive experiences with horses. For example, man B has difficulties to get dressed. An opportunity to wear t-shirts decorated with pictures of horses makes it easier.

During the first visit, man A first walked without paying any attention to his surroundings and almost bumped into the horse. Then I took his hand and we stroke the horse together. After stroking the horse he noticed what was happening around him. During the fourth meeting with a horse, his son accompanied us to the horse carriage drive. Climbing up to the carriage seemed to be fun for the man. He was now much more active. After the horse carriage drive he spontaneously approached the horse. Man A also wanted to help the horse driver in loading the horse and the carriage onto the horse truck.

Man A's communication abilities and level of activity have improved in these two years remarkably. The reason for this improvement is, I think, constant nurse-patient relationship combined with various ways of activation:

The following Improvements can be noticed:
- return of eye-contact
- after the treatment he seems to like the friendly social touch of nurses
- interaction, for example, he offered me a piece of chocolate
- In his previous ward he refused to go out and clung to the doorframe, now he enjoys being outside in spite of his respiration disorders
- he helps in the ward, for example, he pushes a coffee trolley
- he is interested in books and magazines, especially those associated with his previous profession, he is also interested in local newspapers
- he is interested in photographs taken by me and also taken by himself earlier
- presently he seems to enjoy meeting his family members in the ward and in his home, which he has visited with me. A special case was last summer when man A and his family members and me visited a tractor museum , after which we had lunch in a café. All the time he was very alert and looked curiously at other customers. At the ward where the food is put in front of him without any social stimuli he often forgets to continue eating. In the café there was no problem in that.
- when I started to draw a stick figure omitting one half, he completed the missing parts

- he cannot write, but sometimes he likes to draw and it seems that he can express his feelings by drawing a facial expression in a simple human face I have drawn
- his medication has been reduced remarkably
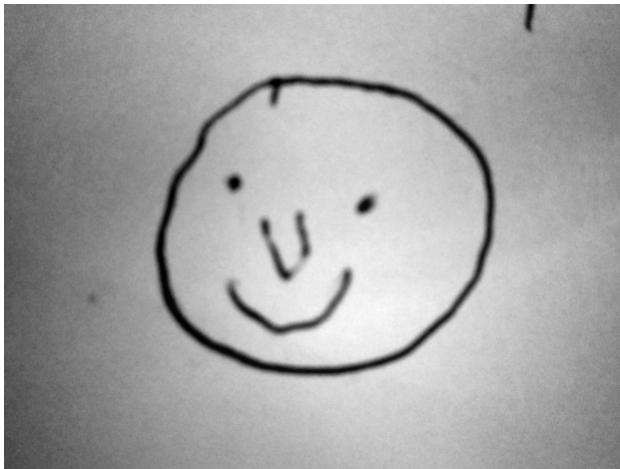
This is the happy facial expression Man A drew when I showed him the brochure of the tractor museum. The tractor museum is located in an area which has been well known to him and where he has been happy in his healthy days. Maybe this experience evoked positive memory traces.

Nurses:
During this experiment, the self-confidence of the nurses has increased notably: they find it easier to go out from the ward with patients with challenging behavior and cross the borders of ordinary life in the ward. This experience has encouraged the nurses to use their own creativity in their daily work: for example listening to music in the shower and toilet.

CONCLUSIONS AND FUTURE PLANS
This experiment of social pedagogical horse activity with demented people in long term care has opened up new possibilities to rehabilitate them. Taking residents out from the ward and its monotony of everyday routines and in contact with nature gives them stimuli that link them to their previous life and present world.

The ideas of social pedagogical horse activity and other animal assisted activities could be easily extended to the treatment of many people that like animals or are not scared of them. It would help if all experiences from non-pharmacological treatments concerning demented people could be collected to one data base.

The nearby nature is a low-cost, versatile, but often underrated resource, which should be better taken into account when constructing new caring home settings and repairing old ones. Inviting family members to participate in different activities like visits to museums, cafés, horse driving, and walking in the woods helps them to conform to the illness of their family member. Life goes on in spite of the dementia.

DIALOGUE BETWEEN SUBSTANCE ABUSE SERVICES AND ELDERLY CARE

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INTRODUCTION

The reasons for starting a project focusing on substance abuse problems among the elderly, that is, among Finns over the age of 60, were threefold: 1) the share of the elderly in the Finnish population is increasing rapidly; 2) the consumption of alcohol in Finland has increased in all age groups; 3) there are no substance abuse services targeted at those over the age of 60, and, on the other hand, professionals working in the field of elderly care do not have expertise in substance abuse issues.

We have been cooperating with seven elderly care NGOs and eleven municipalities. Representatives from these NGOs have been part of our steering group and some of them have also taken part in producing training materials and organising training sessions with us. The four key organisations of the project: The Finnish Blue Ribbon (2005–11), Helsinki Deaconess Institute (HDI) (2005–11), Church Resources Agency (2005–11), and Blue Ribbon Foundation (2005–08) operate in the field of addiction issues, and one of them has also extensive experience in elderly care (HDI). The fifth key partner, Age Institute Kuntokallio Foundation (2005–08) has focused on the research and development of services for the elderly. In addition to these organisations, municipalities in the metropolitan area (Espoo, Helsinki, Vantaa) and in the more sparsely populated Eastern Finland (Kainuu, Kuopio, Pieksämäki, Savonlinna) have also taken part in the development work.

For a long time, we thought about what the ultimate goal of client work was for us. We had come to the conclusion that addiction work among the elderly is not meant to primarily help them to stop drinking, but, above all, to support them in their everyday life. We set out to help clients in every way we could, except by trying to reduce their drinking: by helping them cope with their everyday lives and by increasing the quality of their lives. Some of the activities are listed here. They are entirely ordinary things to do with elderly people and services we can provide. But because of alcohol, most of the elderly were not entitled to these services. And yet, their need for services could be reduced with the help of such small things.

SUBJECTS

The client work undertaken during the project involved 129 clients over the age of 60 who have a recognised drinking problem. With the help of these clients, new ways of carrying out addiction work in the homes as well as peer group activities have been developed.

METHODS
Changes in the clients' situation have been assessed and evaluated comprehensively in co-operation with the client and professionals in the service network, using process descriptions. The processes and quality of peer group activities have also been examined with the help of process descriptions and discussed in the project steering group.

RESULTS
Our project workers have managed to make small but long-lasting changes that help the clients to get back to a more normal daily life. Thus the main result of the project is that it is important to put the life of the elderly problem drinkers in order before changes in alcohol use can occur. When the client has, for instance, found new social contacts, a change in alcohol use is possible.

In both addiction work and work among the elderly, it is important to see and meet the person as a whole. It is a start that requires that elderly care services should recognise substance problems and that addiction services become more mobile. From the field of addiction work we have adopted the notion that a change is possible for everyone. This includes elderly people. Even though our main goal was not reducing the drinking of the clients, about half of them did significantly cut down on their drinking. Process training sessions with professionals to increase know-how have also been fruitful occasions for dialogue. The training programmes that have lasted for several months have provided the opportunity to focus on values and attitudes. There has been time to analyse client cases even in great detail, which has meant that the training has also touched upon work supervision.

In addiction work among the elderly, one should pay attention to ethical questions, prevention of marginalisation, and care and support, as well as to strengthening the client's resources and agency, and increasing the know-how of those who work with the elderly. The paradoxical thing is that even though we talk of addiction work, it is not always a good idea to focus first on the substance abuse – it is better to attend to other things first. Working in this way requires a deep understanding of the nature of substance problems and analysing one's own prejudices, and, on the other hand, understanding things associated with ageing and with being an elderly person. This requires dialogue between elderly care services and addiction work as well as increasing know-how on both sides.

EVALUATION PROCESS AT HOME – MAXIMUM INDEPENDENCE

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ABSTRACT
Sustaining our independence, self-esteem and self-confidence are important for all of us. For how long one is able to live on her/his own is one of the key questions pertaining to how you feel about your life. ELOAPU is an evaluation process, developed to be carried out in a person's home-environment. It is a service pack and a tool to evaluate how elderly people are able to manage their everyday tasks at home. The evaluation makes it possible to give suggestions on what kind of changes should be made to facilitate everyday life, to make it safer and less strained.

Keywords: Home, Evaluation, Safety, Aids for daily living, Environment

INTRODUCTION
As a child we learn via our senses what kind of a place the world is. Then we go to school, we learn some more... in later education some more... and at work the learning still continues.

We use all that learning and observation in our lives. It helps us to locate ourselves in the neighbourhood, in society, in the whole world – to find out who we really are. When we talk about aged people, independence and independent living, one's ability to live at home and coping with everyday tasks, is based on all what was said above. Learning might get slower, but it will not stop when we are retired and getting older. Elderly people also need to maintain the sense of being an active part of the community.

Sustaining independence and self-confidence is very important for everybody – you could say it is one of the basic needs in our life besides drinkable water, food, enough sleep, and so on. In today's society, when we talk about aged people, we seem to forget how important the feelings of independence, self-esteem and self-confidence are. How long we can live safely at home and feel that our life is valuable, are central factors that make us confident with ourselves and affect the way we see our life.

In today's world, the value of life and time is too often thought to be based on one's ability to produce something – constantly growing industry and materialism, and at the same time trying to get expenses as low as possible, searching for savings in business. The treatment and care of elderly people happen to be among the sectors that public authorities often focus on while trying to economize and balance budgets.

A few weeks ago there was a story in a newspaper on how an aged couple who had spend tens of years living together, were separated from each other into different care units because they needed slightly different care. Both were upset, of course. In the 20th

century it should be possible to provide care in a way where humane considerations come first and after that all the other things, no matter how difficult it is.

WHAT KIND OF HELP IS NEEDED?
There is an obvious need for nursing homes and care homes. But that is not reality for all elderly people. Some of them want to stay and live in their own houses and cottages too, not even willing to move into bigger units. Therefore there should also be enough possibilities to continue living in one's own house and make living at home easier, maintaining the meaningful life with hobbies or everyday tasks and paying attention to safety.

It is not easy to say and take the responsibility of the decision on who is able to continue to live at home and who is not. To facilitate it, we have developed the ELOAPU-service. It is an evaluation system that can be used as a tool to evaluate how elderly people are able to manage their own personal Activities of daily living (ADL) skills at home, how safe the home itself and its surroundings are for independent living. The ADL skills can be divided into safety and physical ability, to dress or undress oneself, motor ability in the kitchen, washing/bathing, toileting and taking care of personal hygiene.

A part of ADL is Instrumental activities of daily living (IADL), which includes using a phone, using local transportation, the ability to cook, running errands, laundering and overall housekeeping. ELOAPU includes a holistic observation of a person's functional capacity in daily activities (for example safety, physical strength, balance, memory, etc). It is based on evaluation made by an occupational therapist at the clients' own environment, a questionnaire form, a face-to-face conversation including a conversation with a family member or a close friend if needed (see, for example, Figure 1).

The service evaluates the environment itself – is there something to be done to make living at home safer and easier. For example, if there is a need to provide a handle-bar for the toilet or somewhere else, should the doorsills be removed, are any aid articles for kitchen needed (a jar opener, thicker handles for a fork or a spoon, etc.), are the stairs inside or outside safe, and so on. It also gives suggestions if there is simply a need to make some changes in the personal way of doing things – perhaps to learn a safer way to cook potatoes, take a shower or reach a coffee can.

If the client is recovering, for example, from a stroke, this evaluation process is a useful tool to support rehabilitation. The knowledge of the occupational therapist and versatile working experience also help the evaluator to see the points in need of rehabilitation. The evaluation process provides information on whether any aids for daily living are recommended. During the evaluation process the person's own values, personal interests and social contacts are also determined.

WHAT, WHEN, WHY?
The decision on what-when-why to get any aid for daily living should be based on a real need, and on a real need only, never to be considered an intrinsic value or the need to make a far-away family member feel less guilty. It should also be borne in mind that the most expensive article to aid daily living is the one that is bought but never used. Aids for daily living can only help when they are individually fitted and designed for the exact need, used properly and under control.

...ING A PHONE
o turnable dial   o push-a-button dial, large numbers   o push-a-button dial, ordinary ...
o senior-gsm   o ordinary gsm

able to phone	o yes	o no
able to pick up	o yes	o no
numbers to be seen clearly near the telephone	o yes	o no
searching numbers from memo-book	o yes	o no
searching numbers from a catalogue	o yes	o no
searching numbers from the memory of telephone	o yes	o no
remembering numbers	o yes	o no
-----		
safe-phone user	o yes	o no

RUNNING ERRANDS

picks a daily post from a post-box	o yes	o no
o makes small buyings for foodstuffs independent		
o makes buyings for foodstuffs, using a taxi		
o foodstuffs are brought by somebody		
able to see what should be bought to the fridge	o yes	o no
paying bills, banking	o yes	o no

COOKING
o able to cook by her/himself
o able to cook when helped
o able to warm meals in   o a cooker   o an oven   o a mi...
...us her/his special diets if necessary   o yes   o n...

Figure 1. A piece torn from an ADL evaluation form. In the ADL form all questions are more specific and the ability level is also marked.
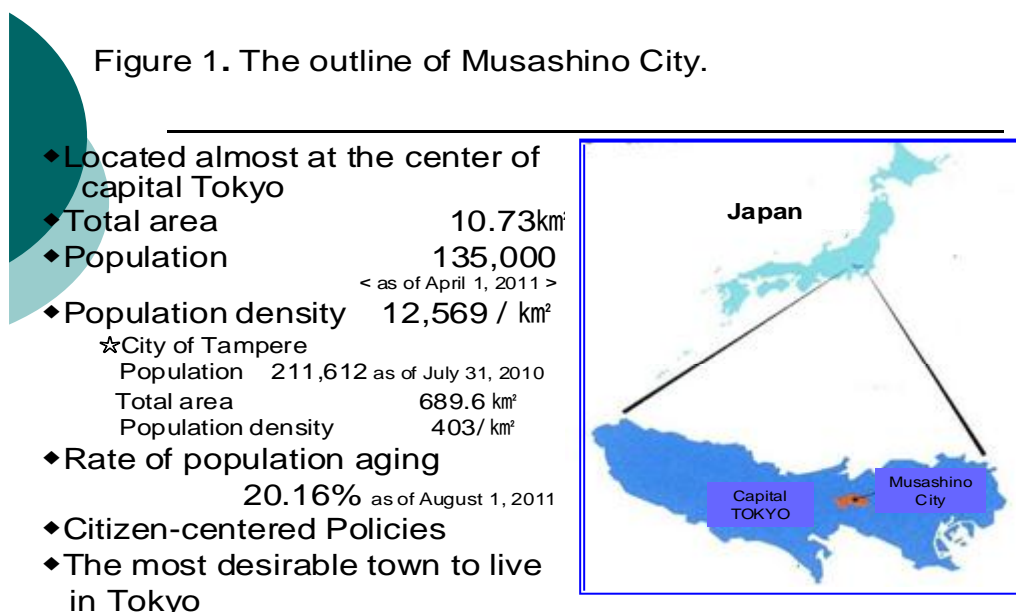
AT THE END

If an aged person is able to live longer and safer at home, it will of course provide the desired savings to the authorities. After all – the most important thing is what independence could bring to the elderly people: Safe, motivated and active life at home, sweet home.

THE PUBLIC WELFARE OF MUSASHINO CITY – TEN-MILLION HOUSE AND REVERSE MORTGAGE PROGRAMS

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Musashino is a municipality which always keeps an eye on the social situation and catches the needs of the residents from time to time accurately. During the past years, the city has launched a number of unique and initial welfare measures in Japan. Here we have picked up two outstanding programs.

Figure 1. The outline of Musashino City.

- Located almost at the center of capital Tokyo
- Total area 10.73km²
- Population 135,000
  < as of April 1, 2011 >
- Population density 12,569 / km²
  ☆City of Tampere
    Population 211,612 as of July 31, 2010
    Total area 689.6 km²
    Population density 403/ km²
- Rate of population aging
    20.16% as of August 1, 2011
- Citizen-centered Policies
- The most desirable town to live in Tokyo

The City of Musashino is located almost at the center of capital Tokyo (Figure 1). The total area is just 10.73 km². It is one of the smallest cities in Japan. Although it is small, the total population exceeds 130 thousand, which makes it the second most populous city in Japan. Just like other cities, Musashino also faces the problems of population aging. The percentage now reaches 20 %, and it is estimated to reach 26 % in 2030. The characteristic of our senior population, i.e. the population over 65, is that 53 % are over 75. That means more than half of our senior population is over 75. The demand of elderly care services is very high. Although we have limited land resources, we successfully launched important measures which allow us to offer an affluent living environment to our residents. Musashino is a compact city that is rich in public services and community activities. This is why one of our areas is elected as the most desirable living town of Tokyo in the past 6 years.

The history of our welfare services shows how we have been walking at the forefront in step with our people at an early stage. Musashino City was founded in 1947. Two years later, we had already set up the Red Cross Volunteer Corps; in 1973, we started the lunch delivery service which is prepared by local rest homes. Also, the Silver Volunteer Corps was set up to inspire the concept of co-support. It provides an opportunity for the healthy senior residents to support those who need assistance. The word "silver" in Japan also means the "elderly people" because of the silver gray hair color. In the

1980s, we stepped up to challenge initiative programs like private pay in-home care service as well as the Reverse Mortgage scheme. Afterward, we launched Japan's first specific daytime service center named "Kitamachi". This picture shows the visit of Princess Diana in 1995 (Figure 2).

When the Long-term Care Insurance was implemented in 2000, we developed a number of option services like a door-to-door service car called "Lemon Cab" for those who have difficulties to use the public transport. Presently, our policy is based upon the concept of Community-Based Rehabilitation. We cooperate with local institutions and authorities to systematize our public services in order to provide lifelong support to let all of our residents live at their home as long as they wish regardless of their age and personal condition.

Figure 2. Brief history of Musashino city's welfare services.

As all of you know, the 1970s was the period called "the Japanese post-war economic miracle". Our country had a historical economic growth. The development of medical technology resulted in longer lives; family formation changed from extended family to nuclear family. The responsibility for elderly care shifted from families to society. Since we did not have enough supportive public services, those who were not able to perform basic activities of everyday living could only move to nursing homes or rest homes for long-term care. If their families were able to take care of them, they could remain at home; or if they had enough savings, they could employ caregivers themselves. However, for those unmarried, who lived single and did not have enough savings, if they refused the public facilities, they had nowhere to go.

The Musashino model of reverse mortgage scheme is a municipal measure that differs from those offered by financial institutions (Figure 3). We offer a welfare fund secured on borrower's house or land that allows them to receive the "in-home care services" as well as use it to support their living expenses. Borrowers can keep living at their home under the assistance of social workers and nurses whom the city government dispatches. This ensures the borrowers can remain at the local community for the rest of their life even though they are unable to take care of themselves.

Figure 3. Musashino model reverse mortgage scheme.

A MUNICIPAL MEASURE OFFERS WELFARE-FUND SECURED ON BORROWERS' REAL ESTATE
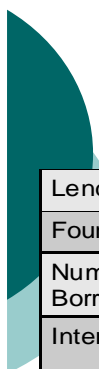
◆**Social Backgrounds**
- Family formation changed from extended family to nuclear family
- Lack of social support

◆**Personal Backgrounds**
- People hold properties but have no income
- People prefer to remain at their home for life

Here is the outline of our Reverse Mortgage scheme. This loan is offered for exchanging the welfare services. Borrowers can receive a monthly amount of 80,000 Japanese yen (€720) in maximum which includes the welfare service charges. This money is also applied to cover the cost of living as well as the necessary expenses of old age. Registered local residents of age 65 or older as well as the disabled people who agreed to accept city's private pay in-home care services are eligible. Real estate here refers to land and buildings. For apartments, since the market value changes easily, the total floor area and the building year will be considered. To avoid risk-taking, the appraised land value will be under 80 %, and 50 % for an apartment. Due to the floating of real estate value, re-adjustment will be taken every 3 years as to re-settle the upper limit of the loan amount. This loan comes due when the borrower quits the contract, dies, or when the loan reaches the upper limit. The borrowers are required to return the loan principal with interest added (Figure 4).

Figure 4. Outline of Musashino model reverse mortgage (welfare-fund loan service)

Lender	Musashino City
Founded	April 1, 1981
Number of Borrowers	Currently 22 cases (119 cases in total)
Interest Rate	Variable rate. The long-term prime rate released on every March 1 (1.65% on March 1, 2011). Annual rate not exceed 5%.
Purpose	To exchange welfare services as well as the costs of living, medical, home reforming, and others (e.g. Maintenance of the land and the building)
Eligible	①Live in Musashino longer than a year (aged 65) or the disabled. ②User of private pay in-home care service administrated by welfare authorities. – Musashino City Welfare Public Corporation - ③Pledge the real estate for loan
Real estate	・ Land, building ・ Apartment or flat (not older than 13 years of total floor area above 50㎡)
Upper loan Limit	80% of the appraised value. 50% for an apartment or a flat.

There are three biggest drawback factors (Figure 5). Actually, the first two risks are what we are now facing. People live longer, which has resulted in a longer loan period. The loan amount exceeded the appraised value of the real estate before they died. Also, at the time we started this scheme, the market value of real estate was estimated to rise. However, the value depreciated especially after the bankruptcy of Lehman Brothers in 2008. The value fell lower than the loan limit. Furthermore, the National Long-term Care Insurance conducted in 2000 allows residents to receive welfare care services at a lower cost. Residents face less difficulties in this kind of care expenses. Moreover, the improvement of social security system and welfare services reduced the need of this loan for just exchanging for the care services. Instead, we are now facing another kind of needs. Residents who have enough savings require more financial support to "enjoy" everyday life. I can say honestly that this is a turning point. Is it still necessary for our government to impose a tax for running this kind of a loan service?

Figure 5. Present situation and future prospect.

A. Three main risks
　①Longevity
　②Reduced estate value
　③Rising of interest rate
B. The newly implemented national long-term care insurance
C. Changes of needs

People prefer cost of living rather than welfare services

Is it necessary for us to keep using our tax to debt this loan service?

The reverse mortgage scheme has been working for 30 years. We are proud of it because it was a "pathfinder" that showed the possibility of the finance-welfare integration model; although it may not be able to match today's needs, the focus on "remain living at home as long as desired" was a distinctive view in Japan (Figure 6).

Figure 6. A beautiful green wall covers municipal facility "*matsumoto*".

Ten-Million Houses are a kind of municipal facilities but not operated by city government (Figure 7). We only provide support to each steering body which is formed either by local citizen's groups or by not-for-profit agencies. The latter will work under the support of an operating committee formed by the local people to reflect the voices of the users. Musashino government only supplies a building without charge as well as a subsidy of a maximum of 10 million Japanese yen per year per facility to cover the running cost.

Figure 7. A new view on community welfare.

☐ **Ten-Million House Program**☐

① **Among the community**

② **Steering bodies are formed by local people. Lunch and daytime activities are offered.**

③ **City supplies a building without charge as well as operating subsidy of upper limit 10 million yen (about €90.900,00) a year.**

This is Musashino's original program since 1999.

This program started due to the National Long-term Care Insurance which was enacted in 2000. My city – Musashino is proud of its long history on offering its original services. However, this national standard insurance is a kind of <u>One Size Only</u> system. Those who cannot fit this size will be excluded and lost the qualification; the number of these ineligible people was estimated to be 20 to 30 %. So, what can we do to help these people? Our answer was "try to keep offering the same services by ourselves". At that moment, we decided to start up the General Ordinance for Elderly Welfare to administrate this Ten-Million House program. The principle of this program is to create a "co-support" system among the communities and the local people that will result in elevating our ability to perform the community welfare (Figure 8).

"Support" is one of the keywords in our community welfare measures. The balance of "Self-support, Co-support and Public-support" is very important (Figure 9), especially the portion of "Co-support" which can cover the shortcomings of the public service and ease individual responsibility. The City of Mustachio has a long history of working with the community volunteers like offering home delivery lunches. So, it is not difficult for us to facilitate our people to offer care to those able to manage everyday activities but needing someone to keep an eye on their safety. The role of city government is to act as "sub-support". Only a little sub-support is good enough to lower the running cost and enable a high and just-fit service quality. This structure not only benefits the users, but also offers an opportunity to the steering bodies, i.e. the local people, to contribute to their own community.

Figure 8. **B**ackground - why we need it?

National Long-term Care Insurance takes place
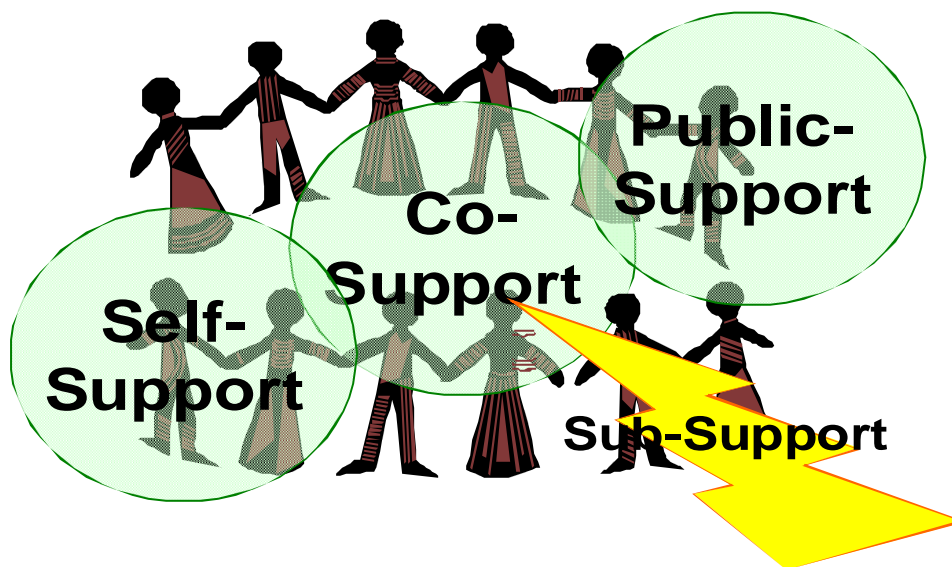Who and how to support those cannot fit for this insurance?
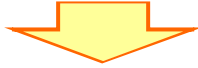
Musashino's General Ordinance for Elderly Welfare enacted
to compile and systematize a set of measures concerning senior residents
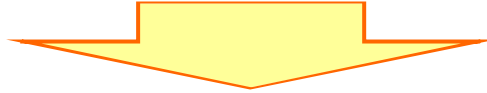
**Our answer is "Ten-Million House"**

Figure 9. The structure of "co-support".

Public-Support

Co-Support

Self-Support

Sub-Support

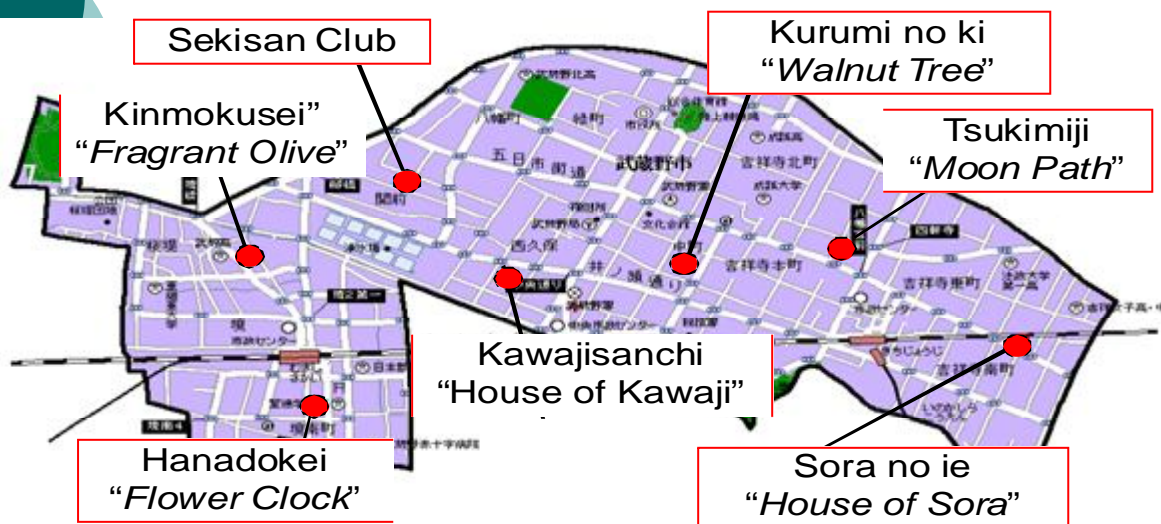The basic concept of Ten-Million Houses is "near", "compact" and "easy" (Figure 10).
① "Near" can encourage access and enable users to keep staying with their family.

② "Compact" makes it easy to administrate even without managing expertise and lowers the running and maintenance costs.

③ "Easy" results to quick correspondence to the needs.

Figure10. Concept of ten-million houses.

Near — to access

Compact — to use

Easy — to manage
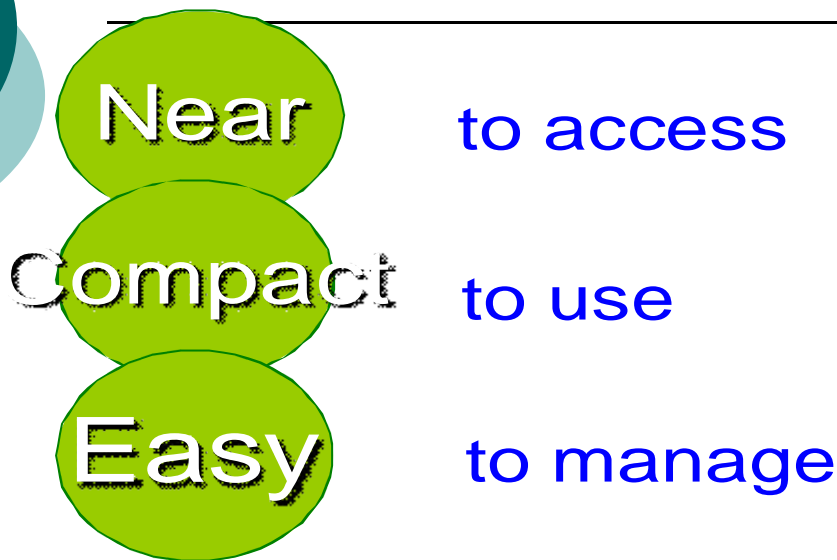
This map shows the well-balanced locations of 7 Ten-Million Houses around Musashino (Figure 11).

Figure 11. Locations of ten-million houses.

Sekisan Club

Kinmokusei" *"Fragrant Olive"*

Kurumi no ki *"Walnut Tree"*

Tsukimiji *"Moon Path"*

Kawajisanchi *"House of Kawaji"*

Hanadokei *"Flower Clock"*

Sora no ie *"House of Sora"*

All of our Ten-Million Houses offer daytime activities in addition to each facility's special offers. I have to emphasize that we will not impose "one-size-fits-all" policy on each facility. Instead, we encourage a unique approach for a wide range of users. Today, I would like to introduce one of them, i.e. Hanadokei, which means Flower Clock (Figure 12).

Figure 12. Achievement of each facility in fy2010.

Name of Facilities	Characteristic	Total number of users	Number of memberships	Total number of volunteers
House of Kawaji	Limited daytime services	2,812	81	646
Moon path	Lectures for volunteers	3,892	137	566
Sekisan Club	Short-stay at emergency	Daytime 799 Short stay 473	39	0
House of Sora	Limited daytime services	4,504	68	716
Fragrant Olive	Limited daytime services	5,870	241	761
Flower Clock	Intergenerational facility	Elderly 4,430 Babies 1,282	253 224	490
Walnut Tree	Limited daytime services & respite service	5,334	181	1,080

This is the building of "Flower Clock" (Figure 13). Other than apartment building, this kind of 2-story private house is very common in Japan. We don't want it to look like a facility but just something like visiting a neighbor's home. The buildings are borrowed and supplied by our government. Among 7 Ten-Million Houses, only this consists of 2 floors. We make use of these two floors to encourage intergenerational friendships. The steering body of this significant facility is formed by 8 local housewives, not any experts

Figure 13. One of the Ten-million houses–**hanadokei** *"flower clock".*

Total Floor Area:137.45㎡
User per day: 17elderly

To use the Ten-Million Houses, membership registration is required. Last month the total number of memberships of Flower Clock was 154 elderly, 133 babies and 16 children. All Houses supply lunch service to the users of that day. While enjoying our

staff's home-made foods, users can sit at the same table, talk to each other just like a big family. Hanadokei opens from 10am to 4pm almost every day. It provides many activities including physical exercise, singing, handicraft, mah-jong, handmade postcards. Users can choose any as they like. We received a lot of feedback. For example, "It has so many choices that allow me to challenge new things." Another one is, "I live alone, so I am happy that I can talk with someone else and get useful information."

The second floor of this facility is a children's room. Babies and infants are welcome to play with wood blocks and many other toys with their parents. A young mother told us that her baby enjoys the place very much. She can make friends here and learns how to communicate with grandpa and grandma". Many activities are offered for the children to inherit the traditional cultures including teaching the tea ceremonies or playing Koto instrument. The senior users work as teachers.

These Ten-Million Houses are not the kind of elderly facilities that only offer daytime activities and lunch. They provide an opportunity for the elderly to make new friends, deepen the relationship for forming a better community. Each facility has been supplied the unique service of emergency short-stay, intercommunication between the young and elderly people forms mini-day-service and has been made a place for community residents.

We now have 7 Ten Million Houses and we intend to set up more, considering a good balanced distribution with other elderly facilities. All the Ten Million Houses have been placed in Musashino City. Since we are composed of thirteen residential areas, as you know, Musashino is not a big city, so our future figure is "no more than one House per area". We know that not only Musashino's, but also Tampere's senior residents prefer to keep living in their own community for the rest of their life. I believe that this program may show an effective model to answer these demands.

Ten years have passed since Kawajisan-chi was set up in November of 1999 as the first Ten Million House. Until now, the Ten Million House has played the role of preventive care with the objective of enabling visits and motivation in life, and the role of reassurance, ensuring the safety of seniors living alone in communities. The Ten Million House heralds an era of thinking about a response to the users of severe certification indication of long-term care need owing to the aging of the population in the future and the role of the community welfare stronghold. And new ones also need to be set up in the blank area because the system does not yet cover all areas of Musashino City. There are great hopes that the Ten Million House further grows and becomes a familiar sight in the future.

ASSISTIVE SMART TECHNOLOGY

Harri Airaksinen

Services and Logistics, Real Estates and Construction, VTT Technical Research Centre of Finland, Tampere, Finland

INTRODUCTION

During the last decades, both the public and private sectors have started adopting ICT not only for back office service management, but also for end-user services access. ICT supported digitally enhanced services can provide benefits both for service providers in the form of more efficient service delivery and management and for the customers in the form of better service access and availability. Likewise, the efficiency of the service processes can be improved. The opportunities to improve the independent living of the elderly are significant.

VTT is an active participant, for example, in the EU Joint Programme AAL (Ambient Assisted Living). The main goal of the programme is fostering the emergence of innovative ICT based products, services and systems for ageing well at home, in the community and at work, thus improving the quality of life, autonomy, participation in social life, skills and employability of older people and reducing the costs of health and social care (Figure 1).

Figure 1. VTT in wellness and healthcare.

- VTT is an internationally recognised innovator and research institute partnering with industry and health service providers
- Areas of expertise include:
  - *Medical image and signal processing*
  - *Bio-informatics*
  - *Personal health systems*
  - *Independent living*
  - *eHealth and telemedicine*
  - *Point-of-care diagnostics*
  - *Service process development*
- More information: www.vtt.fi/health

NEW ELDERLY CARE SOLUTIONS

VTT actively develops new solutions for independent and assisted living, health telematics and diagnostics (Figure 2). All the projects are executed in collaboration with companies and public sector health care providers. VTT also works on solutions for preventing diseases and ageing and maintaining employability. In addition, the service concepts are an essential part of the research and development agenda.

Figure 2. Ambient Assisted Living

Population aging, resource constraints and shortage of skilled labour are global challenges for the healthcare sector today. VTT's activities in health and wellness are focused on innovations enabling, preventive, cost effective and high-quality healthcare (Figure 3).

Figure 3. Telemonitoring architecture in the renewing health project.
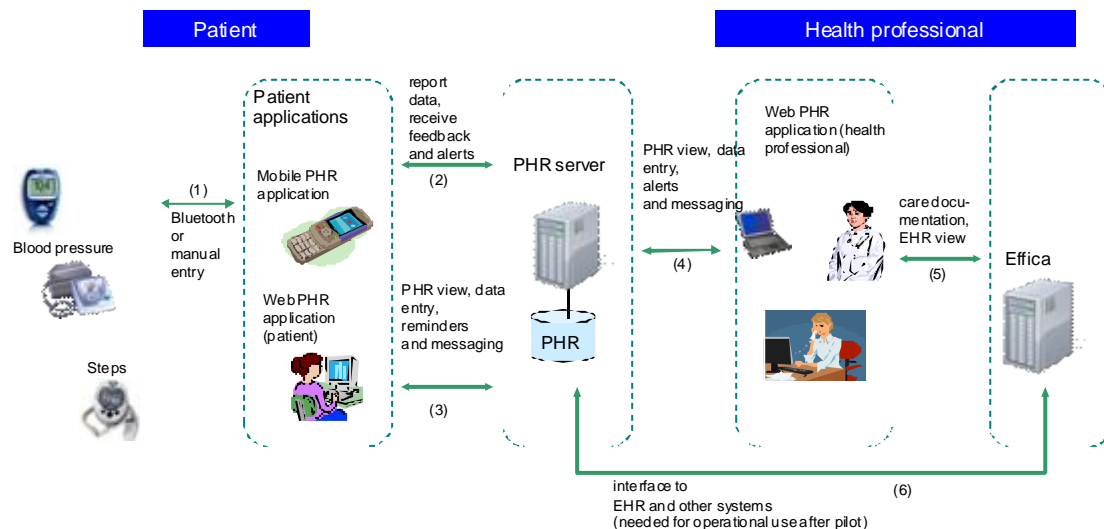
Figures 4 – 10 introduce some of the technical applications and service concepts for the elderly care developed as part of the joint research projects at VTT. The case examples will consist of The Tampere Telecardiology Centre, Social Media for All Elderly People and Virtual Coach.

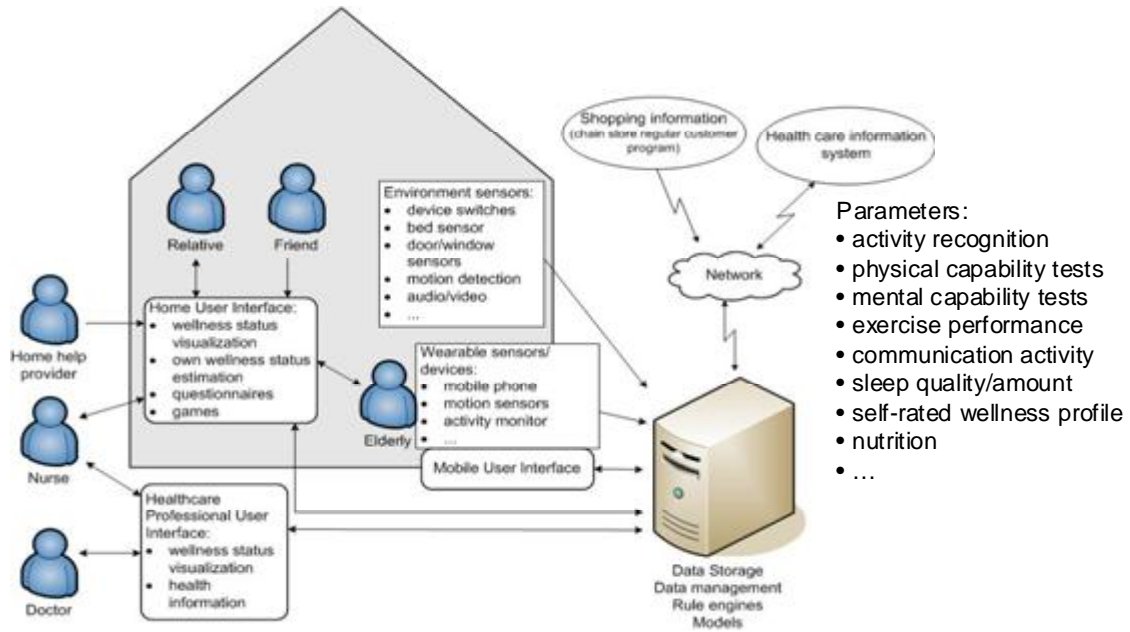## Figure 4. Elderly online wellness management and living at home.

Figure 5. VIVAGO IST: Activity recognition with movement sensors

- An intelligent wearable social alarm system for elderly
- Enables cost efficient continuous 24/7 monitoring of wellness of the subject
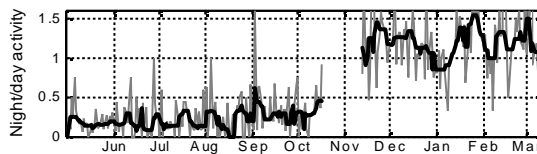- Reliable user-triggered and automatic alarms for emergency

Figure 6. Touch screen Elderly online wellness management application.

INCLUDES
- Questions and reminders
  - Customized content
  - Appear at chosen time
  - Gather wellness data
- Calendar
  - Wellness of the elderly at a glance
- Access to additional applications
  - Speed game, Exercise, Memory game, Phone, Diary, Internet…
- Web login for distant monitoring

GOAL
- Online wellness monitoring
- Promoting wellness
- Ease the work of the care personnel
- Faster reaction to the wellness changes

BASIS
- Oulu Wellness profile

USER INTERFACE
- Touch screen
  - Simple (no mouse or keyboard needed)
- HP TouchSmart 22" was chosen
  - Big screen
  - All in one (PC in the monitor)
  - Multifunctional (e.g. TV tuner)

AmIE-project, ITEA2

ADDITIONAL APPLICATIONS
- Offer interesting things to do
- Develop both mind and body
- Produce wellness information

FURTHER DEVELOPMENT
- Combining wellness data from various sources
- Developing the wellness visualization techniques

Figure 7. Physical Exercising Application.
for exercising motivation and monitoring

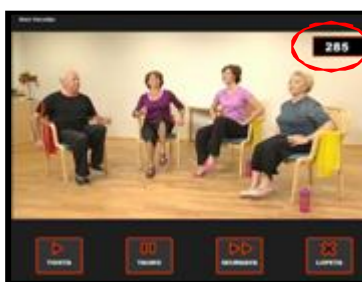**EXERCISE INTENSITY DURING TRAINING**

GOALS
- Physical exercising motivation of elderly
- Monitoring of exercising action sensors and questions
- On-line feedback during exercise and exercise summaries afterwards
  → motivation and monitoring
- Provide information for personal trainers or physiotherapist

FEATURES
- Configurable video playback capabilities
- Saves exercises to diary (time, duration, measurements, answers)
- Configurable questions related on exercise (pain, strain)
- Exercise measurements
  - Movement sensors for intensity measurements
  - Heart rate belt for heart rate monitoring

EXERCISE INTENSITY SUMMARY (RIGHT-LEFT BALANCE)

(www.ball-it.com)   (www.zephyr-technology.com)

Figure 8. Motivation and coaching of elderly.

- **Virtual coach:** give instructions for everyday tasks of elderly by using speech, text and videos. SW can be used via touch screen PC at home. Virtual coach can for example propose: "*It is an excellent day for walking in the park*".

INTENSITY 76 %   HR: 92

- **Interactive physical exercising:** user can choose exercise herself or application can propose suitable exercise for day. Based on measurements, application gives on-line exercise feedback for the user. Exercise actions are also saved history log and they can be viewed there later.

Figure 9. Virtual Coach Reaches Out "To Me" (V2me).

- 1.5.2010-30.4.2013, AAL project
- Combines real life and virtual social network elements to prevent and overcome loneliness in Europe's aging populations.
- Enhance the joy of life of the network members
  - Continue participating the society
  - Share their knowledge and experiences
  - Stay mobile and cognitively agile
- V2me supports active ageing by increased integration in the society
  - provision of advanced social connectedness and
  - social network services and activities.
- V2me implements this goal by a flexible assistive living solution to prevent loneliness with particular emphasis on acceptance by senior end users.

Figure 10. HearMeFeelMe - Achievements: Tag N' Touch.

- Business problem
  - Need to access information through an intuitive and simple user interface
- Result
  - An application for attaching audio information to everyday items, such as food containers, using a mobile phone and NFC-tags.
  - An application for medicine package identification and retrieval of important information using audio interface and NFC, covering the whole service chain from the pharmacy to the home of the users.
- Benefits
  - For end-users: improvements in their every day life
  - For society: people have more equal possibilities to access information and they are able to live more independently
  - For companies: new business opportunities
  - For VTT: building competence on the usefulness and user experience of new contactless services

Ibumax 400 mg
1-2 tablets 3 times a day…

COOPERATIVE NETWORKS AND ECOSYSTEMS

Besides developing new technology, we are increasingly engaged in assessing current and future technologies and applying them for the needs of our customers. As an independent partner, VTT actively contributes to building cooperative networks and ecosystems.

THE INTERNATIONAL SOCIETY FOR COMPLEX ENVIRONMENTAL STUDIES (ISCES)

The Society was established on September 25th, 1984 in Tampere, Finland. The setting for the foundation of the organization was the First International Conference on The Combined Effects of Environmental Factors ICCEF 84 Conference. The subsequent conferences were held in 1986 in Kanazawa (Japan), in 1988 in Tampere (Finland), in 1990 in Baltimore (USA), in 1992 in Saariselkä (Finnish Lapland), in 1994 in Toyama (Japan), in 1996 in Tampere (Finland), in 1998 in Baden (Austria), in 2000 in Savonlinna (Finland), in 2002 in Takatsuki, Osaka (Japan), in 2007 in Tampere (Finland) and in 2009 in Hakusan (Japan).

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The Members of the Board of Directors of the ISCES Society as well as the Editorial Board assist in editing the scientific periodical Archives of Complex Environmental Studies

Work among the elderly

Olavi Manninen, Editor

The main theme of the book is multiform work among the elderly. This practice orientated book is particularly welcome and important because work among the elderly and ageing people is very topical both nationally and internationally.

The book introduces the newest expertise in the field. The book offers a view of the modern high-quality and successful work with the elderly.

The newest expertise can be used, for example, in creating with or mobilizing good working models, assistive equipments and smart technology, procedures and conventions for the care of the elderly on regional, municipal and corporate level, reorganizing working communities, care and work among the elderly, and reforming training programs related to this work and cooperation between educational institutions and work life and between actors on public, private and third sector.

The book provides useful material for creating a management model geared to helping the employees to continue working.

The book shows how important it is to understand and command the functional whole that consists of the three sectors of the worklife ability: work, life and ability. Central from the point of view of continuing and coping with the work is the command of the work, a functional of working culture in working communities, and the satisfaction of the employees with their own life. This applies to everybody working in any industrial sectors, still with the elderly, irrespective of their age and job description.

> **Worklife ability, what does it mean?**
> "Worklife ability refers to the ability and willingness of persons to learn, apply and combine the latest know-how and knowledge related to products, work, work ability, working community, working environment and the business operations of the company (as well as their interconnections) in creative ways that benefit the individual, the company and society"
> (Olavi Manninen 2004). **Handbook of Worklife Ability**