European Foundation for the Improvement of Living and Working Conditions

Danish Work Environment Cohort Study, 2000 (DWECS)

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The Danish Work Environment Cohort Study from the National Institute of Occupational Health (NIOH) shows that the work environment and working conditions have generally improved from 1990-2000. However, these developments are largely explained by a changing labour force rather than by interventions in the work environment and in the occupational health system.The results of the study reveal that working conditions vary significantly across sectors and in relation to different job categories. For instance, the majority of jobs with a high degree of exposure to various work environment risks are found among unskilled workers in crafts and manufacturing.

Trends in a 10-year perspective

The working conditions, health and lifestyle of Danish employees have been systematically mapped in a national study, the Danish Work Environment Cohort Study 2000 (DWECS) *(in Danish)* , since 1990. DWECS is conducted by the National Institute for Occupational Health , NIOH (Arbejdsmiljøinstituttet, AMI). It covers the full labour market, including both employees and the self-employed. The study contains information on more than 10,000 adults in Denmark, the majority of whom have been followed since 1990.

The work environment has generally improved

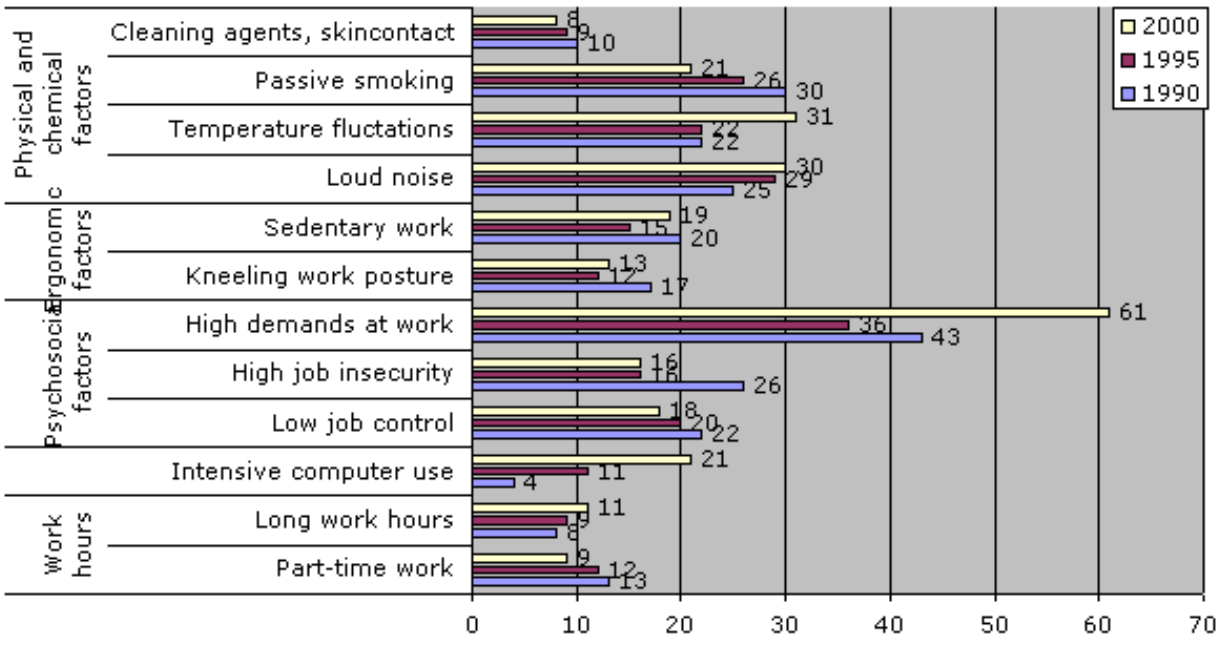
The study concludes that the working environment of Danish employees has improved overall from 1990 to 2000. Among other aspects, encouraging trends (shown in Figure 1) include significant decreases in relation to:

- exposure to psychosocial work factors, such as job insecurity and low job control;
- exposure to chemical work factors, such as skin contact with cleaning agents and passive smoking;
- exposure to ergonomic risk factors, such as a kneeling work posture;
- part-time work.

(*Scand J. Work Environ Health* , 2003:275; The Danish Work Environment Cohort Study 2000, p.23)

However, the study also reveals that some areas of the Danish work environment have worsened during the last decade. For instance, the study shows increases in high demands at work, long working hours, temperature fluctuations and exposure to noise.

Figure 1 Changes in work environment factors 1990-2000, Denmark (%)



Impacts of a changing labour force on the work environment

Another important lesson from the study is that changes in the labour force have influenced trends in the working environment. For example, an investigation of selected work factors showed that labour force changes, such as a growing proportion of employees with a high degree of job control and a declining proportion with low job control, explained the encouraging trends in the psychosocial work environment. Changes in the labour force also explained the decline in skin contact with cleaning agents and half of the increase in long work hours.

These findings indicate that much of the improvements in the Danish working environment from 1990-2000 were due to changes in occupational distribution among Danish employees. Likewise, it suggests that the improvements in the Danish working environment cannot be attributed to work environment intervention, but may be simply explained by changes in the labour force. (*Scand J Work Environ Health* , 2003: 278-279).

Job-related differences

The survey shows significant differences in work environment risks by job category. Specific work environment risks are strongly related to specific jobs. The overall working conditions vary among job types.

Jobs with high risk exposure in the workplace

Table 1 lists the 14 job categories with the worst working conditions among 57 job categories that were examined. It appears that the majority (11 out of 14) of the job categories with poor working conditions are reported in crafts and manufacturing. The remaining three job categories are: male postal workers, female cleaning assistants and male workers in the wood processing industry.

In addition, as many as 10 of the job categories with the highest degree of exposure to working environment risks are unskilled; only four job categories constitute skilled work. The skilled job categories are: electricians, mechanics, machine setter-operators and plumbers.

The table shows that physical, thermal, chemical and ergonomic risks are primary contributors to the total degree of risk exposure. Eight of the 14 job categories are among those experiencing the highest degree of psychosocial risk exposure. Unskilled workers appear to be more exposed than skilled workers to psychosocial work environment factors.

The main reason why the list contains only two female jobs is that few women are employed in crafts and manufacturing.

Table 1 Jobs with the highest degree of exposure to working environment risks (employees and self-employed, 2000)

Occupation (gender: m=male; f=female)	Total risk exposure	Exposure to physical, thermal and chemical risks	Exposure to ergonomic risks	Exposure to psychosocial risks
Postal workers (m)	High	High	High	High
Cleaning assistants (f)	High	Average	High	High
Agricultural workers (m)	High	High	High	Average
Machine setter-operators (m)	High	High	Average	High
Mechanics (m)	High	High	High	Average
Plumbers (m)	High	High	High	Average

Metal workers - unskilled (m)	High	High	High	High
Electricians (m)	High	High	Average	Average
Wood industry workers (m)	High	High	High	High
Construction workers (m)	High	High	High	Average
Slaughterhouse workers (m)	High	High	High	High
Food, drink and tobacco workers (m)	High	High	High	Average
Food, drink and tobacco workers (f)	High	Average	Average	High
Storage- and harbour workers	High	High	High	High
Explanations: High = highest degree of risk exposure; Average = average risk exposure				
Source: Danish Work Environment Cohort Study, 2000 (p.7)				

Jobs with low risk exposure in the workplace

Looking at the 14 job categories with the lowest degree of work environment risk exposure, Table 2 shows that the majority are office jobs. An equal number of job categories for men and women are represented on the list.

These jobs report particularly low exposure to physical, thermal and chemical work environment factors. Only female day care teachers and self-employed male farmers report exposure to these risk factors.

In relation to the psychosocial working conditions, it appears that five of the 14 job categories have a degree of exposure to psychosocial work environment risk factors, which equates to the average. These jobs are: female managers, male sale assistants, female primary school teachers, female computer professionals and female bank clerks.

Table 2 Jobs with the lowest degree of exposure to work environment risks (employees and self-employed, 2000)

Occupation (gender)	Total risk exposure	Exposure to physical, thermal and chemical risks	Exposure to ergonomic risks	Exposure to psychosocial risks
Engineers and architects (m)	Low	Low	Low	Low
Computer professionals (m)	Low	Low	Low	Low
Computer professionals (f)	Low	Low	Low	Average
Teachers - primary school (f)	Low	Low	Low	Average
Technicians (m)	Low	Low	Low	Low
Teachers - day care	Low	Average	Average	Low

(f)				
Teachers - residential home (k)	Low	Low	Low	Low
Managers (m)	Low	Low	Low	Low
Managers (f)	Low	Low	Low	Average
Clerks (m)	Low	Low	Low	Low
Accountants and bookkeepers (f)	Low	Low	Average	Low
Bank clerks (f)	Low	Low	Average	Average
Sales assistants (m)	Low	Low	Low	Average
Farmers - self-employed (m)	Low	Average	Average	Low
Explanations: Low = low degree of risk exposure; Average = average risk exposure				
Source: Danish Work Environment Cohort Study, 2000 (p.7)				

Sector-related differences

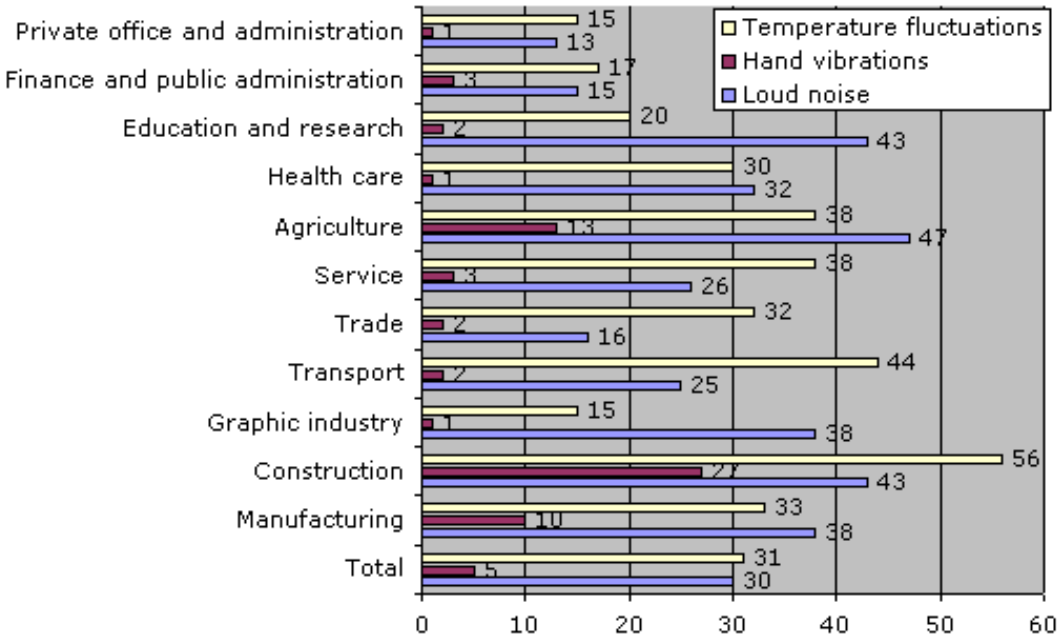
Results from the study reveal distinct sector-related differences concerning various work environment risks.

Construction sector: physical and thermal risk exposures

In the category of exposure to physical and thermal factors, employees from the construction sector in particular report high exposure to the three selected risk factors: exposure to loud noise (43%), hand vibrations (27%) and temperature fluctuations (56%). Employees in sectors such as manufacturing and agriculture also report relatively high exposures to these physical and thermal risk factors. Exposure to very loud noise is reported in education and research, while workers in the transport sector experience considerable temperature fluctuations.

The degree of exposure to loud noise, hand vibrations and temperature fluctuations is relatively low among employees in finance/public administration and private office/administration.

Figure 2 Employees reporting physical and thermal exposure (%)



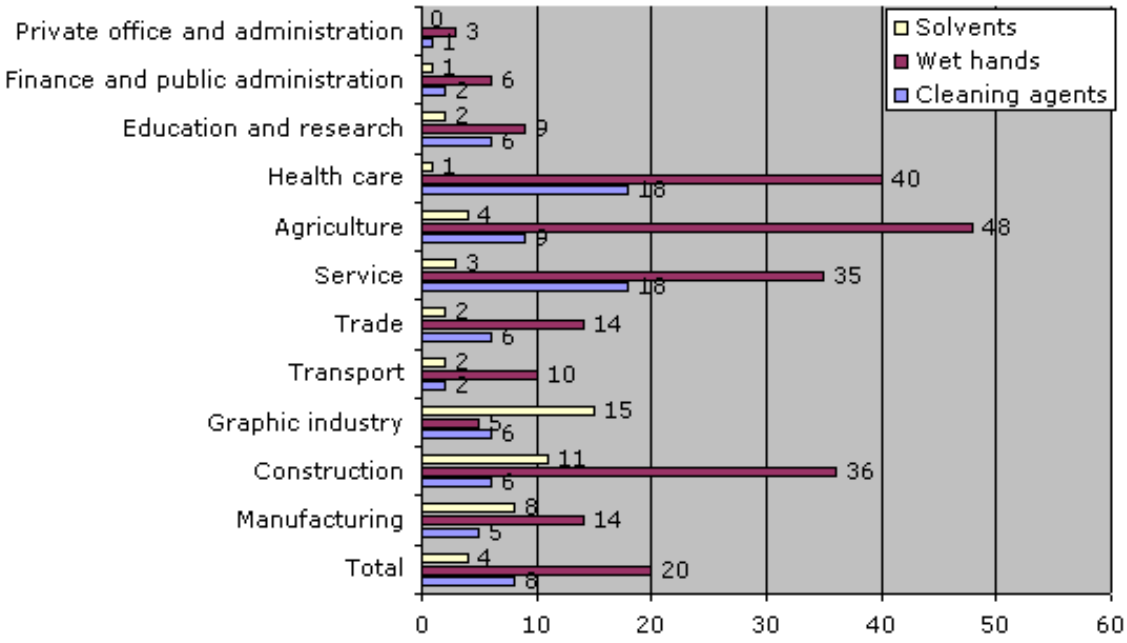
Health care and service sectors: chemical risk factors

Chemical risk factors such as skin contact with cleaning agents, and wet hands are particularly prevalent among employees in health care and service. Employees in construction and agriculture also report high exposure to wet hands.

Regarding exposure to solvents, employees in the graphic industry (15%), construction (11%) and manufacturing (8%) report high degrees of exposure compared with all sectors (4%).

Exposure to chemical risk factors is particularly low in finance/public administration, private office/administration and education/research.

Figure 3 Employees reporting chemical exposure (%)



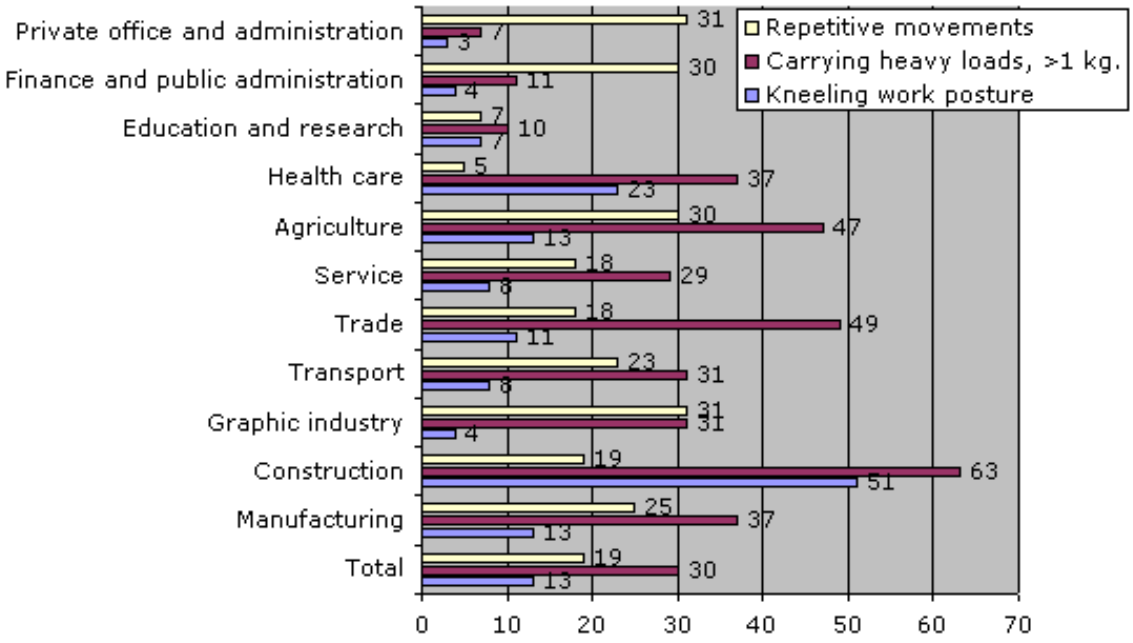
Exposure to ergonomic risks

Exposure to ergonomic risk factors varies significantly between different sectors.

The frequency of a kneeling work posture is particularly high in construction (51%) and health care (23%), whereas repetitive movements are more often experienced by employees in private office/administration and the graphic industry (each at 31%), and in finance/public administration and agriculture (each at 30%).

With regard to carrying heavy loads, construction (63%), trade (49%) and agriculture (47%) report a significantly higher exposure than the average in all sectors (30%). Likewise, health care and manufacturing (each at 37%) are among the most exposed sectors in carrying heavy loads.

Figure 4 Employees reporting ergonomic exposure (%)



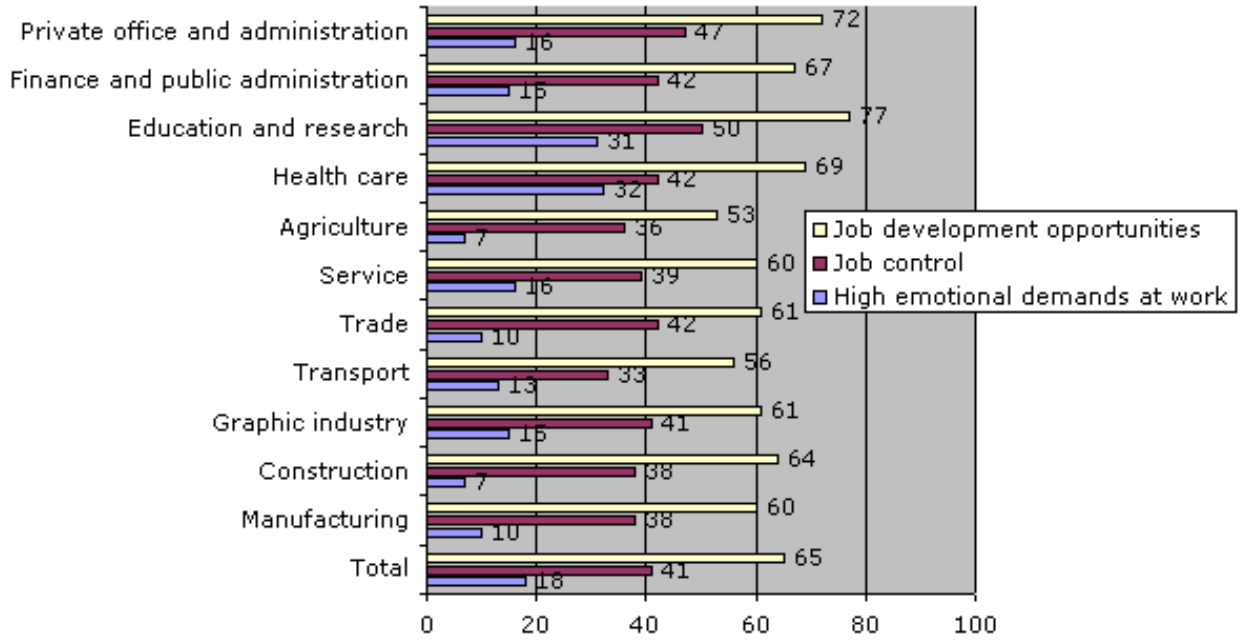
Exposure to psychosocial risks

In relation to emotional demands at the workplace, the frequency varies significantly by sector. Two sectors - health care (32%) and education and research (31%) - report significantly higher emotional demands than the average (18%). Emotional demands are low among employees in agriculture and in construction (each at 7%), and in trade and manufacturing (each at 10%).

Job development opportunities are relatively high in almost all sectors (65%). However, employees in agriculture (53%) and transport (56%) report fewer job development opportunities than the average. Employees in education and research (77%) and private office/administration (72%) have the best job development opportunities.

Employees in transport (33%) and agriculture (36) have significantly lower job control compared with all the sectors (41%).

Figure 5 Employees reporting psychosocial exposure (%)



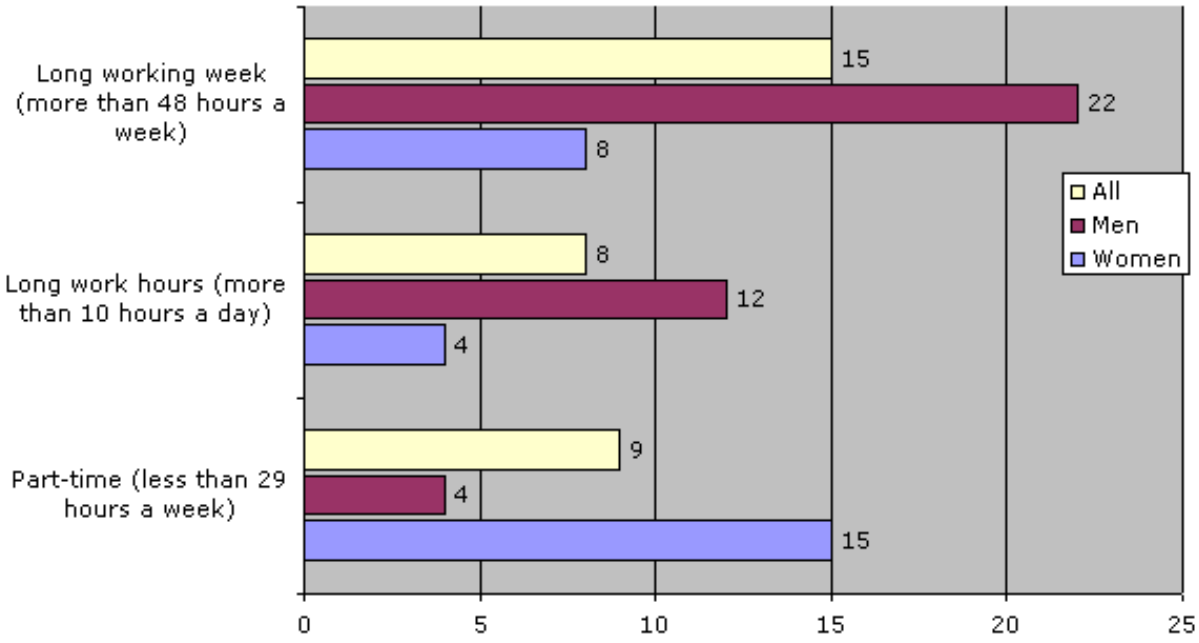
Gender-related differences

The DWECS results show that gender still has a significant influence on a series of aspects of work environment and working conditions. However, it should be noted that these differences are to some degree explained by the gender distribution in relation to job categories and sectors.

Differences in work hours are decreasing

During the last decade, part-time work (less than 29 hours per week) among women has decreased from 24% in 1990 to 15% in 2000. In the same period of time, no changes in part-time work can be observed among men (4%). This indicates that the gender-related differences in terms of working hours are decreasing. However, long working hours (more than 10 hours a day) are still more prevalent among men (22%) than among women (8%).

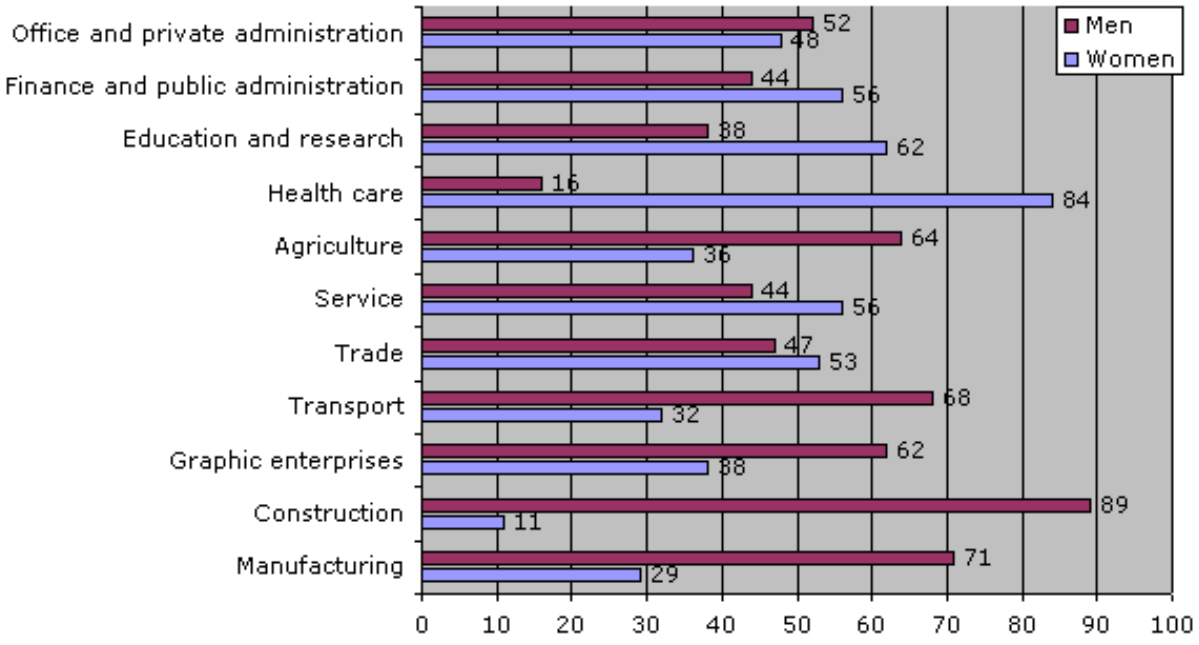
Figure 6 Work hours, by gender (%)



Working conditions and gender

Exposure to various work environment risk factors differs according to gender. This is mainly due to gender-related difference by occupation. For instance, more women than men are working in health care (84% of workers in this sector are female), education (62%) and finance and public administration (56%), whereas more men are present in sectors such as construction (89% are male) and manufacturing (71%).

Figure 7 Sectors, by gender (%)



With regard to ergonomic risk factors, more women (23%) than men report repetitive movements (16%),

particularly affecting hands and arms.

The overall picture of the psychosocial working conditions is relatively uniform in relation to gender. However, there are some important differences. The frequency for high emotional demands as well as demands for hiding emotions are much higher among women compared with men. In addition, women have lower job control and report more conflicts in the workplace.

Men are more likely to be exposed to physical, thermal and chemical risk factors. For instance, exposures such as loud noise, temperature fluctuations as well as draughts and coldness are more prevalent among men.

About the study

As outlined earlier, the Danish Work Environment Cohort Study, 2000 (DWECS) is a national study that describes working conditions, health and lifestyle among Danish employees and the self-employed. DWECS is an extension of the Danish Employee Study (WEC), which was conducted in 1990 and 1995. The change of name is due to the fact that the 2000 study covers the full labour market, not only employees.

Purpose

The purpose of the study is to monitor the working population for the prevalence of occupational risk factors as well as for health effects. The study seeks to identify changes in health and labour market status as possible consequences of occupational risk factors.

Based on these objectives, DWECS makes it possible to:

- carry out cross-sectional analyses of the prevalence of work environmental exposures and health effects among various groups;
- carry out follow-up studies on the association between work environment exposures and health and labour market effects.

Questionnaires

The study includes questions regarding:

- physical, chemical, thermal, ergonomic and psychosocial exposures;
- labour market status;
- health and symptoms, including the diagnosis of a doctor and a subjective assessment by workers on their own health.

Table 3: Details on the Danish Work Environment Cohort Study, 2000

Survey name	The Danish Work Environment Cohort Study, 2000 (DWECS)
Frequency	Conducted every five years3 editions: First edition 1990, next edition 2005
Sample size	1990: 9,700 people1995: 11,347 people2000: 12,322 people
Sampling strategy	Split panel design: Stratified simple random sampling design with proportional allocation
Register used for the sample	Statistic sample of the Danish population drawn from the Central Population Register
Interviews	Type of interview: By telephoneLocation of interview: At home
Contact points	National Institute for Occupational Health, Denmark

Website	http://www.ami.dk/nationale%20data.aspx
Sources: Buur, Hermann (2003): The Danish Work Environment Cohort Study. Purpose, design, variables, analyses and plans, p.1 European Foundation for the Improvement of Living and Working Conditions (2003): Working conditions surveys - A comparative analysis, Annex: Data sheet for DWECS	

Commentary

Interpretation and use of the study results depend to a large degree on the point of view.

From a public health perspective, it is important to be aware of the overall changes in the work environment. These changes indicate the proportions of different work environment exposures, as well as their impact on sickness levels in Denmark. From this point of view, the trends can therefore be judged as encouraging, as the impact from several important work environment factors on sickness levels in Denmark is declining (*Scand J Work environ Health* , 2003:276-277).

On the other hand, the trends of the last decade are less encouraging from the perspective of actual intervention in the work environment. As mentioned earlier, the improvements that have been observed are strongly related to changes in the labour force. These findings question to what extent the occupational health system, as set up by Danish legislation, has contributed to improvements in the work environment.

This suggests, firstly, that future work environment intervention should be targeted at specific sectors, since the survey reveals significant variations among sectors in relation to different risk exposures. Secondly, labour force changes should be closely monitored and their effects included when prioritising work environment intervention and legislation. Knowledge of these changes may help to predict future working conditions.

In addition, the results from the DWECS demonstrate that the gender issue remains highly relevant in relation to working conditions. Although the differences in working conditions between men and women can, to a large degree, be explained by the gender distribution in sectors and job categories, it is nevertheless of great importance to focus any intervention accordingly.

Authors: Henrik Stener Pedersen, Susan Mahler and Claus Bo Hansen

List of publications linked to the survey

Main report:

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