Development and valorisation of a sentinel system in occupational health care for various risks factors (among which chemical and biological agents and psycho-social factors) Usefulness of an occupational health sentinel system in evaluating the effectiveness of primary preventive actions.

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Introduction

The objectives of this project were:

. to validate a computerised system of routinely collected data in occupational health care for signalling health problems in the working environment,

. to design a quality assurance procedure for this data collection, and to assess whether the system can be used to evaluate primary preventive actions.

Materials and methods

As a recognized inter-company occupational health service, IDEWE in 1996 offered its services to over 31,000 employers, particularly in the Flemish and Brussels Regions. These employed together 352,000 employees, of which 162,000 underwent a periodical occupational medical examination. This sample represents approximately 7% of the total Flemish working population in 1996.

The measuring instrument was an optically readable form on which a selection of data recorded at the medical examination were registered. Most of these variables represent the situation at the moment of the examination. The computed indicators are thus prevalence rates. For the years 1993 to 1996, stratified analyses were performed according to gender, age, and profession. These analyses were carried out using the statistical software packages SPSS and STATVIEW.

Results

A. At the level of the Central Research Institute

1. Further development and operationalisation of the measuring instrument.

For selected occupational groups and health problems, comparable signals were sought in the IDEWE data base and in the data base of five Dutch ARBO-Services. Overall, the correlation between signals from the two systems was weak. Further research efforts are needed in order to obtain internationally comparable, reliable, and valid information.

A working group was started to supervise the adjustment of the measuring instrument. Items showing low reliability, low epidemiological and practical usefulness, or proving difficult to standardise will be omitted from the instrument.

Research into the quantification of signals of health impairment.

In the research reports 'The health status of Flemish employees, 1992 and 1993-96', signals of health impairment were investigated. The most relevant results of the most recent report are summarised.

Thirty-six percent of the female and 31% of the male employees reported sick leave during 1996, and this figure was stable between 1993 and 1996. For occupational accidents, the male-to-female ratio was reduced (respectively 9% and 5%). These percentages have somewhat decreased in time. Of the men, 48% reported regular physical exercise, of the women, 43%, and this percentage increased between 1993 and 1996 in all age groups. Non-smokers are the majority in both genders: approximately 75% of the women and 60% of the men. Over time, males have tended to smoke less in each age group, except in the 15-24-year age bracket where smoking has risen; among females an increase is seen, except in the 25-to-44-year age bracket, where smoking has decreased. Thirty-eight percent of the males and 23% of the females suffer from overweight (Body mass index - BMI 25 - < 30 kg/m^2), and respectively 12% and 11% are obese (BMI > 30 kg/m^2). These percentages were higher in 1996 than in 1993 in each age group. Among men, 17% were following medical treatment at the time of medical exam, the figure being 23% among women.
With increasing age the occupational accident rate decreases among males, and remains stable among females. The anticipated rise of sick leave with age is not found, probably due to selection of relatively healthy workers with time. The practice of physical exercise decreases most prominently among men. The percentage of smokers peaks age 35 to 44 years, and decreases thereafter. The percentage of employees under treatment increases markedly in both genders from the age of 35 years on. Moreover, the percentage of obese workers rises with age.

The analyses according to occupational group generated the following signals: occupational accidents appeared more frequent in physically demanding occupations (metal construction workers, miners, bricklayers), dermatological problems in occupations exposed to irritating and allergenic agents (hairdressers, cleaning personnel), and vascular problems in occupations where working in a standing position with low mobility prevails (salesmen, hairdressers, washers).

Using data from 1992, specific health problems were investigated among nursing personnel and compared to cleaning personnel. Nurses overall seem to score better for most of the health indicators, which confirms the association between the professional status and health status.
Using data from 1994 and 1995 respectively, we investigated the association between obesity and the prevalence rates of sick leave and occupational accidents. The association was most prominent among female employees.

Using data from 1993 we analysed the use of medication. Twenty percent of the men and 26% of the women were taking medication at the time of the periodical medical examination. The prevalence rate of treatment increased with age.

In addition, data from 1993 were used to investigate health problems among female night workers. It could not be concluded that night workers had more health complaints than day workers, but a probable effect of selection has to be taken into account.

Special attention was given to psychosocial factors. The measuring instrument based upon internationally validated questionnaires such as the 'Karasek-list' was used among approximately 6,000 employees in various industrial sectors. A shortened list containing 10 items was used among 548 respondents in a validation study. The effect of 'complaining behaviour' (negative affectivity = NA) on stress assessments through questionnaires was also studied.

Correcting for NA weakened the association between psychosomatic complaints and job characteristics. In addition, the validity of a questionnaire on self-reported sickness and accident leave was studied. The questionnaire appeared as a convenient and practical instrument for gaining insight into the characteristics of sick leave, but a certain amount of under-reporting error has to be taken into account. The association between back complaints, psychosocial and physical working conditions, sick leave, and burnout was investigated in seven Flemish homes for the elderly. Employees reporting the least control also reported more sick leave and had higher job dissatisfaction than colleagues reporting large control possibilities. Finally, differences in working conditions, back complaints, sick leave, and accident leave were studied in various occupational groups within the health care sector. The results suggested an association between the organisational structure of the work and sick leave and psychosocial work load.

Investigation of the time trends of the detected signals

In the cross-sectional time analyses, data from 1993 on were used. A summary of the results is given in Section 2.

Investigation of validity and reliability through specific partial studies.

The statistical technique of computing the 95% confidence intervals for each observer was used as a guideline for distinguishing reliable from less reliable items. It also served as a guiding instrument for quality assurance. Furthermore, the reliability and/or the validity of specific items was investigated in specific partial studies.

Elaboration of a quality assurance procedure.

Each year and for each user, an overview is produced of the prevalence rates of a selected number of health indicators registered by that user. Moreover, the status and progress of the project are commented on at regular meetings of the medical teams.
Adjustment of the instrument is being prepared and supervised by a working group.

B. At the level of the Peripheral Research Groups

The Peripheral Research Groups continue to perform medical examinations with recording of the data on the registration form. Each peripheral group is represented in the working group on 'Adjustment of medical data collection' and they assist in implementing an updated version of the measuring instrument.

Results of the additional study

The protocol of the investigation of the predictive value of clinical back tests at enrolment has been drafted and international experts have reviewed it. Currently, the set of tests is carried out in daily practice by several occupational physicians within IDEWE.

Although after two years of follow-up, the teaching of lifting and transfer techniques to nursing students seemed not to have affected the frequency of back complaints, the severity of these complaints (e.g. the risk of sick leave) was lower in the intervention group. However, more research is needed to provide further evidence.

Finally, a protocol for the longitudinal analysis of lung function measurements has been drawn up.

Conclusions

Despite limitations such as the presence of an observation and selection bias, the lack of any standard method of registration, and the cross-sectional design, the analysis of these routinely collected data have yielded relevant information about the health status of the working population.

A comparison with other studies is difficult because the epidemiological use of computerised occupational health data is still in an early stage. To date, there have been very few reports on aggregated level analyses of this type of data.

Through international collaboration the efficiency of the various monitoring systems could be investigated by studying their reliability and validity. Agreements have to be reached as to the objectives of these systems, the relevant variables to be recorded, ways of registering, and the validity of epidemiological analyses. These agreements will inevitably improve the comparability of these systems.