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The high rate of sickness absence in various sectors, including University Medical Centres (UMCs) was the rationale for entering into the ‘New Style’ Health and Safety Covenant. The Prevention Programme Physical Workload was introduced under the terms of the UMC Health and Safety Covenant. The objective of the programme is to reduce complaints relating to the posture and locomotor system among personnel employed in care-related departments of UMCs. This PhD thesis evaluates different aspects of the programme’s implementation, including working conditions, locomotor system complaints, absence due to these complaints and behavioural aspects in relation to physically demanding working conditions.

In 2001 the UMCs signed a health and safety covenant designed to increase their workforce participation (more hands at the bedside). This covenant is an agreement between the eight Dutch UMCs, the trade unions and the Ministry for Social Affairs and Employment (SZW). It aimed to cut back sickness absence, reduce the numbers of new work disability claimants and accelerate the reintegration of sick employees. In 2000 the average absence rate in the UMCs was 6.8%.

The UMC Health and Safety Covenant (2001) covers the topics of harmful substances (cytostaticca and anaesthetic gases), Risk Inventory and Evaluation (RI&E), psychological strain, latex allergy, integrated occupational health and safety care, RSI and physical workload. These themes were established following a baseline measurement taken in 1999 (VAZ, 1999). In 2000 the rate of new work disability beneficiaries in the UMCs came to 1.15%, while the absence rate (as already stated) stood at 6.8%. One of the aims of the UMC Health and Safety Covenant was to bring about a gross reduction of 1% in the numbers of new work disability claimants for each participating hospital in 2003. Secondly, it aimed to ensure that the sickness absence rate as a result of locomotor system complaints would not exceed 1.5% of the total absence rate in any of the hospitals. Finally, it sought to ensure that the absenteeism rate due to psychological complaints would not exceed 1.2% in any of the hospitals.

Prevention Programme Physical Workload

One of the biggest projects in the UMC Health and Safety Covenant involved the reduction of exposure to physical workload. UMC data shows that two thirds of UMC personnel are exposed to a high degree of physical strain. There are some reports in the literature of a relationship between physical workload and the prevalence and incidence of low-back pain.
The national working group on physical workload first investigated those preventive activities that had delivered the best results, the ‘best practices’, in the eight participating hospitals. The Prevention Programme Physical Workload, developed and implemented in the UMC Groningen with the support of the Northern Netherlands Ergonomists Collective and the department of Human Movement Sciences Groningen, emerged as the most complete, well-founded programme. The programme uses Fishbein and Azjen’s (1980) theory of reasoned action, in which the behavioural determinants of attitude, social norm and self-efficacy (ASE) play a key role. In addition to behaviour, the programme deals with technical aspects (the use of aids and adaptations to the workplace) and organizational aspects (employing an ergonomics coach). This approach was adopted by the working group because low-back and neck complaints are predominantly multicausal (Koes and Tulder, 2002).

The target group for the prevention programme comprised hospital personnel from departments with a high physical workload, such as the regular nursing wards, intensive care wards, surgical wards and treatment units.

The objectives of the Prevention Programme Physical Workload were as follows:

- increasing knowledge of physical workload guidelines
- improving attitude, social norm, self-efficacy (ASE behavioural aspects) and intention with regard to physically demanding working conditions
- reducing locomotor system complaints
- reducing absence as a result of ‘locomotor system complaints’
- ensuring that the necessary conditions (ergonomic and organizational) are in place to implement ‘safe moving’
- guaranteeing and consolidating the Prevention Programme Physical Workload

The global research problem formulated in this PhD thesis is as follows: what is the outcome of introducing the Prevention Programme Physical Workload in eight UMCs as part of the Health and Safety Covenant?

The following questions have been formulated

1. what are the results of occupational interventions for primary prevention of musculoskeletal symptoms in health care workers?;
2a. what are the prevalence rates of musculoskeletal complaints of neck-
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shoulder and low back and the perceived exposure to risk factors?
2b. is any association present between physical and psychosocial work-related risk factors and musculoskeletal complaints of neck-shoulder and low back?
3. what are the results of a multifactorial intervention programme to reduce physical workload in the nursing profession?
4a. do ASE determinants (Attitude, Social influence, self Efficacy) as well as ‘intention to change’ change one year after the implementation of an occupational intervention on wards with hospital workers?
4b. do hospital workers with reduced low back pain present higher difference scores on the ASE determinants and ‘intention to change’ than hospital workers with an increase in low back pain or when low back pain remains the same?
5. how do nurses older and younger than 45 years perceive their health, their physical and mental work effort and do they present different sickness absence rates?

Chapter 2
In this chapter thirteen studies have been evaluated. The objective was to obtain more insight into the effects of occupational interventions for primary prevention of musculoskeletal symptoms in healthcare workers. The Cochrane Collaboration methodological guidelines for systematic reviews functioned as a starting point for the review. The studies meeting the inclusion criteria were evaluated on methodological quality and effects. Eight outcome areas were established and defined as areas whereupon an effect was determined in at least two studies. A method based on levels of scientific evidence is used to synthesize the information available. We found strong scientific evidence for the beneficial effect of occupational interventions for the areas physical discomfort, technical performance of transfers and the frequency of manual lifting. Insufficient evidence was found for the areas absenteeism due to musculoskeletal problems, musculoskeletal symptoms, fatigue, perceived physical load and knowledge. Training and education combined with an ergonomic intervention was found to be effective.

Chapter 3
The aim of this part of the study was to gain more insight into the prevalence rates of musculoskeletal complaints of neck-shoulder and low back and to determine the relation between physical and psychosocial work-related risk
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factors and musculoskeletal complaints in non-specialized nurses, operation room nurses, Intensive Care (IC) nurses and X-ray technologists. The study population consists of 3169 employees affiliated to eight university hospitals in the Netherlands. In all groups of nurses we found high prevalence rates of musculoskeletal complaints: low back 76%, neck-shoulder 60%. Operation room nurses perceived more neck-shoulder complaints (twelve months prevalence) than non-specialized nurses and IC nurses perceived less severe low back complaints than non-specialized nurses. Four physical risk factors and one psychosocial factor were associated with low back complaints in all groups. The results indicate that both low back complaints and neck-shoulder complaints are major health problems in the four professional groups under study. The exposure to risk factors is perceived differently by each of the professional groups.

Chapter 4
In this chapter the results of the Prevention Programme ‘Physical Load’ are described. The aim of the intervention is to heighten the awareness of work-related risk factors, reduce musculoskeletal symptoms of the low-back and neck-shoulder region and sickness absence. In addition, we were interested in the nurses’ perceptions on the relationship between work and musculoskeletal symptoms. Nurses of regular wards (n=466) of six University Hospitals in the Netherlands were asked to fill out a questionnaire twice, with one year in between. Just after the first questionnaire was administered the intervention programme was implemented according the protocol. Effect variables were perceived exposure to risk factors at work, 12 months prevalence of low back and neck/shoulder symptoms, sickness absence and the perceived relationship between work and musculoskeletal symptoms. The results of the study indicate that implementation of an intervention programme did not yield effects on the exposure to risk factors and on the reduction of musculoskeletal symptoms. However, sickness absence due to low back symptoms appeared to be lower after the intervention programme was implemented and low back symptoms were perceived as more connected to work related risk factors than before.

Chapter 5
In this chapter the cognitive behavioural determinants of the Prevention Programme ‘Physical Load’ are evaluated. More specifically, we evaluated the ASE determinants and intention to change in relation to low back pain
one year after the implementation of the intervention on departments with hospital workers. Two questionnaires were administered twice among 798 university hospital workers in the Netherlands. After the implementation of the intervention respondents’ baseline measurement and follow-up were compared on Attitude, Social influence, self Efficacy (ASE) and intention to change. Based on changes in perceived low back pain three groups were formed of which mean difference-scores on ASE determinants and intention were calculated and tested. We found social influence, self efficacy and intention were increased one year after the implementation of the intervention. Hospital workers experiencing less low back pain seem to be more susceptible to social influence, are more confident as to self efficacy and have higher intentions to change than workers who experience an increase in low back pain. Hospital workers with a decrease in low back pain also indicate an improvement in self-efficacy, social influence and intention to change. It might be that these respondents are more sensitive to an intervention directed at practical, behavioural components. Such an intervention may be in line with their perception of the cause of low back pain as being dependent upon someone’s physical postures and/or someone’s own behaviour.

Chapter 6
Work, health and aging in the nursing profession is the focus of chapter 6. Work related health is changing when employees grow older. The study described in chapter 6 evaluates health-related factors in relation to aging in the nursing profession. Research questions are:
- how do nurses older and younger than 45 years perceive their health, physical and mental work effort?
- what is the prevalence of musculoskeletal complaints among nurses older and younger than 45 years?
- do nurses older and younger than 45 years present different sickness absence rates and are eventual differences associated with perceived health, perceived musculoskeletal complaints or perceived physical and mental work effort?

We used cross-sectional data of 1993 nurses in eight university hospitals in the Netherlands. The Dutch Musculoskeletal Questionnaire (DMQ) was used to assess the health components. Data on work effort and sickness absence (2002-2005) were derived from a self-report and from the database of the hospitals involved. According to the results nurses over 45 years indicate lower
self rated health, lower physical condition, more musculoskeletal complaints and more physical fatigue after a day working compared to their younger colleagues, additionally they perceive lower mental effort. Sickness absence longer than one week due to low back pain is higher among older nurses. The results of the study indicate that occupational interventions may be worthwhile for nurses of 45 years and older. Tailor made, age-related interventions for older employees should be developed, evaluated and implemented in the organisation. When this process is accompanied by careful monitoring and research, older nurses may be kept more years in their valuable positions at the wards.

Chapter 7
In the general discussion the main findings, the methodological considerations, practical implications and future research are addressed.
Approximately 6330 employees – more than 10% of all those employed in the UMCs – took part in the Prevention Programme Physical Workload, as part of the Health and Safety Covenant. During the covenant period, 400 ergocoaches were trained in the eight UMCs. Products were developed to support the programme, such as practical physical workload guidelines, a course book for ergonomics, an ergonomics coach profile and information leaflets.

The finding of this study indicates the need for a tailor-made component in the intervention programme at the level of risk factors, the target group and age-differences within the target group. Besides, an intervention programme that aimed both at behavioural change and at the use of aids, modifications to the workplace and organizational measures such as deploying ergocoaches give better results.

The further development of the intervention programme should tie in with a health management system which emphasizes a more positive approach such as health and vitality and which gives employees themselves more opportunities to regulate and to shape their work.

Main shortcomings in this study are the absence of a control group, the crosssectional design and data collection with questionnaires only (recall bias).

Structural coordination and cooperation between Health and Safety departments and Human Resources about embedding the topics in their human resources and staff policy is a point of special interest. Behavioural change among large groups of employees by definition entails an
organizational change. It is critical that the policy has to be anchored in the organization; the topic of ‘healthy working’ must stay on the agenda by means of a systematic focus on the desired behaviour.

Nurses as individual employees will increasingly have to take on greater responsibility when it comes to their vitality and a healthy working style and lifestyle. The manager/employer can help by facilitating healthy living and working, by offering health-promoting interventions and by discussing career planning and work variety with employees.

Further research expanding the theoretical model and the Prevention Programme Physical Load is recommended. This might increase the predictive value of the model. Also, in such a study it is important to monitor staff over a longer period (more than a single measurement moment) in order to answer the question of whether the recorded changes are a result of the intervention. Finally, the prevention programme offers points of departure for further development.