Evaluation of a preventive intervention among hospital workers to reduce physical workload
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CHAPTER 1

General introduction
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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 UMCs1, the trade unions2 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%.

Two events in the late 1990s – the implementation of the revised Working Conditions Act and the publication of the findings of the first Occupational Health and Safety Report (1998) – prompted the social partners (the Association of University Hospitals/VAZ and the trade unions) and the government to jointly deploy the Health and Safety Covenant as a policy instrument. The Working Conditions Act placed the emphasis on greater employer and employee responsibility for policy on absence and occupational health and safety. Instead of detailed rules, the covenants offer social partners the opportunity to develop ‘customized’ health and safety policy at sector level (Tripartiete Werkgroep, 2007). The Occupational Health and Safety Report, which is published annually, reviews the current status of and developments in working conditions in the Netherlands (Houtman et al., 1998; 2007).

Sixty-nine covenants covering more than 33 sectors were signed in the Netherlands in an eight-year period (Dekker et al., 2007). This number far exceeds the aims of the Ministry for Social Affairs and Employment. More than half (3.5 million people) of the total workforce were covered by a covenant. For a number of sectors, including the UMCs, the Health and Safety Covenant was extended until mid-2007 (NFU, 2004a and b). In public administration terms, the covenant method marked a new type of policy instrument, in which decentralized development and implementation were
paramount rather than centralized legislation. Covenant objectives are concrete, quantitative and limited in time. Guidelines were also drawn up for the content of covenants; these should relate to work hazards to which a large portion of the workforce is exposed and which have considerable impact on health, such as damage to health, use of medical care, sickness absence and disability. Almost all covenants cover hazards resulting from aggressive behaviour, industrial conflicts, dangerous substances, psychological strain, RSI/CANS (complaints of arm, neck and shoulder), hazardous noise levels, physical strain, workload and reintegration.

**UMC Health and Safety Covenant**

The UMC Health and Safety Covenant (2001) covers the topics of harmful substances (cytostatica 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.

After the Health and Safety Covenant took effect, an action plan was drawn up at sector level, with national working groups created to chart work hazards on a project basis. The national working groups were set up by local project leaders responsible for developing prevention programmes in the affiliated UMCs. Approximately 50,000 people work in UMCs in the Netherlands, 19,000 of whom were affected by the Health and Safety Covenant (NFU, 2004c).

**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 (Hoogendoorn et al., 2000; 2001; 2002) and of neck/shoulder pain (Ariens et al., 2001, 2002). In general, person-bound determinants like age, fitness, force of muscles, psychosocial problems and work-related determinants such as physical load and psychosocial circumstances may influence the origin of low-back pain or neck/shoulder pain. Work-related risk factors for low-back pain are frequent lifting, awkward back posture, whole-body vibration, low job satisfaction, and little social support from either supervisors or co-workers. Neck flexion, arm force, arm posture, duration of sitting, twisting or bending of the trunk, hand-arm vibration, workplace design, high quantitative job demands and low co-worker support are risk factors for developing neck/shoulder 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).

Taking the existing prevention programme as its starting point in realizing the objectives of the Health and Safety Covenant, the working group drew up an action plan to implement the programme in the eight UMCs. The target group, objectives and operationalization of the prevention programme are explained below.

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. Current Risk Inventory and Evaluations (RI&E) from all participating hospitals were used to establish priorities in terms of severity of physical workload. This was followed by a discussion with expert members (ergonomists and industrial
physiotherapists) of the working group.

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

- increasing knowledge of physical workload guidelines
- improving attitude, social influence, 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

Ergocoach
An ergocoach was assigned to the departments, as a vital and integral component of the Prevention Programme Physical Workload, in order to achieve the first two objectives. The coach’s job was to identify physically demanding work situations and to discuss them with the person in question at staff meetings or with the manager. Following on from this, the ergocoach offered targeted advice about the least physically taxing transfer technique.

Quickscan
The Quicksan was developed by the Physical Workload working group and could be implemented by both the ergocoach and the physiotrainer before the Prevention Programme Physical Workload was introduced. The quickscan is a checklist which quickly and simply paints a picture of ergonomic conditions within the department. It asks questions about departmental policy on physical workload.

Training
Using the outcomes of the quickscan as a baseline measurement, a customized training programme containing both a theoretical and a practical component was developed for each department. Its purpose was to teach employees to deal with physically demanding working conditions. The training programme utilized the principles of problem solving theory (Johnsson et al., 2002), according to which employees themselves are
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responsible for managing physically demanding work by making the right choice from among the possible work adjustments available to them. These are the use of aids, asking a colleague for assistance, spreading the physical workload and effectively instructing the patient.

Physiotrainer
The above training was carried out by a physiotrainer, who was a physiotherapist attached to the department where the prevention programme was implemented. The physiotrainer was specifically trained for this programme and was familiar with the Health and Safety Covenant, the health and safety legislation and the Prevention Programme Physical Workload, as well as with norms and guidelines relating to physical workload. The principle of train-the-trainer was used in the training of UMC personnel. Engels (1998) has called into question the effectiveness of this approach because a member of one’s own team has less authority and status among colleagues than an outside expert, such as a physiotherapist. Partly for this reason, the decision was taken to use physiotrainers as teachers.

Aids
Before the Prevention Programme began, all departments were given an opportunity to buy lifting and other aids, which were partly subsidized. The objective was to help reduce physical workload. As a result, the departments were well-equipped when they began the Prevention Programme.

Consolidation
Once the Prevention Programme is underway, it is vital to maintain the knowledge and skill levels, as well as behavioural change in the target group. The ergonomics coach is the linchpin of a good assurance policy. Once the programme has been implemented in the department, the coach must ensure that this issue continues to be addressed. The subject of ‘physical workload’ is a regular component of departmental staff meetings, the annual review and the annual health and safety plan. In addition, work is carried out in accordance with ‘physical workload’ protocols. The ergocoaches also need to maintain their level of expertise by attending national ergocoaching days, regional meetings or meetings organized by the UMCs themselves.

Theoretical framework
The theoretical framework underpinning the Prevention Programme Physical Workload is Ajzen & Fishbein’s (1980) theory of reasoned action (TRA) (Ajzen et al., 2007). The ASE model (figure 1) assumes that ‘intention to change’ and
subsequent behaviour are primarily determined by the cognitive variables of attitude, social influence and self-efficacy expectations. It also postulates that intention predicts subsequent behaviour.

**Figure 1.** The ASE model

The ASE model is derived from the theory of reasoned action (TRA) but incorporates a new dimension, namely Bandura’s concept of self-efficacy (De Vries et al., 1988). Once the target behaviour has been learned and implemented, maintenance of or regression to the old behaviour may occur. Behaviour maintenance and regression subsequently affect people’s cognitions: they receive feedback on their behaviour because they notice that the behaviour has a number of consequences, for example less back pain. If these consequences are expected, this will result in a reinforcement of the attitude towards, in this case, behaviour that avoids physical strain on the back. If, on the other hand, the consequences are not expected, this can result in a changed attitude. People will also interpret the causes of success and failure in a certain way, which then influences their self-efficacy expectations. Self-efficacy expectations are further influenced by people’s skills and the barriers (vis-à-vis the target behaviour) that they encounter. Another key factor is knowledge about risky actions such as lifting, but also about ergonomics, physical workload and adjustment possibilities. People need to know how healthy or unhealthy certain behaviour is before they can consciously undertake behaviour that promotes health. The knowledge that people have about their own lifting behaviour and the ergonomic demands
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of their workplace determines to a large extent how they weigh up the pros and cons of their behaviour and hence their attitude. Knowledge also affects self-efficacy expectations; successfully carrying out certain behaviour produces a higher self-efficacy expectation, whereby the intention to perform behaviour is more likely to be converted into the desired behaviour. As the model shows, an integrated approach is of the utmost importance because there are a number of factors determining the effectiveness of a programme to reduce physical workload.

Research questions

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 the primary prevention of musculoskeletal symptoms in health care workers? (a review)

2a. What are the prevalence rates of musculoskeletal neck/shoulder and low-back complaints and the perceived exposure to risk factors?

2b. Is any association present between physical and psychosocial work-related risk factors and musculoskeletal neck/shoulder and low-back complaints?

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) and ‘intention to change’ change one year after the implementation of an occupational intervention in 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 increased low-back pain or whose low-back pain remains unchanged?

5. How do nurses older and younger than 45 perceive their health, their physical and mental work effort and do they present different sickness absence rates?
Guide for the reader

Chapter two, which focuses on question 1, reports on a literature study of thirteen interventions similar to the Prevention Programme Physical Workload. The results of the interventions are compared in terms of the outcome parameters of sickness absence, health and ergonomic conditions.

Questions 2a and 2b are addressed in chapter three, which looks at the prevention of low-back and neck/shoulder complaints among four occupational groups: regular nurses, intensive care nurses, operation room nurses and radiology assistants. It also examines the principal risk factors in working conditions per occupational group, in terms of back or neck/shoulder complaints.

Chapter four, which looks at question 3, describes the results of the Prevention Programme Physical Workload for nurses at the eight UMCs. It addresses sickness absence as a result of locomotor system complaints, low-back and neck/shoulder complaints as well as occupational risk factors.

Chapter five describes the possible impact of the Prevention Programme Physical Workload on the ASE behavioural determinants and the factor of intention, thereby offering answers to questions 4a and 4b. An association is also established between the ASE behavioural determinants and the prevention of low-back and neck/shoulder complaints.

Differences in health perception between younger and older nurses are described in chapter six, which also looks at the difference in absence rates between these two groups. The chapter examines the extent to which factors such as perceived health, physical condition, fatigue and perceived work effort might explain the differences found (question 5).

Finally, chapter seven analyses more closely the key findings of the five previous chapters and places them in a wider context. The implications of the findings for day-to-day practice are discussed and suggestions are presented for follow-up research. The chapter also looks at methodological aspects of the study and at the extent to which the results can be generalized.
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1 University medical centres (UMCs):

- Leiden University Medical Center, Leids Universitair Medisch Centrum (LUMC), Leiden
- Erasmus Medical Center, Erasmus Medisch Centrum (Erasmus MC), Rotterdam
- Academical Medical Center, Academisch Medisch Centrum (AMC), Amsterdam
- VU Medical Center, VU Medisch Centrum (VUMC), Amsterdam
- University Medical Center Utrecht, Universitair Medisch Centrum Utrecht (UMCU)
- University Medical Center Groningen, Universitair Medisch Centrum Groningen (UMCG)
- UMC St Radboud (UMCN), University Medical Center St.Radbout, Nijmegen
- University Hospital Maastricht, Academisch Ziekenhuis Maastricht (AZM)

2 The trade unions are:
Ambtenaren Centrale Overheids Personeel (ACOP)
Christelijke Centrale Overheids- en Onderwijs Personeel (CCOOP)
Ambtenaren Centrum/Algemene Federatie Zorgsector (AC/AFZ)
Centrale voor Middelbaar en Hogere Functionarissen sector Zorg (CMHF)
References

- NFU (Nederlandse Federatie Universitair Medische Centra, Dutch Federation of University Medical Centers). Health and Safety covenant University Medical Center, sickness absence, prevention and reintegration, (Arbo +convenant Universitair Medische Centra en Academische Ziekenhuizen inzake verzuim, preventie en reintegratie). Leiden, 2004a.
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