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A method for evaluating the load of patient transfers

Occupational Safety and Health Administration

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FOREWORD

This method for evaluating the load of patient transfers originated from needs observed in practical working life. There has been no Finnish method for evaluating the load of patient transfers available to occupational health care and occupational safety and health personnel as part of the identification and evaluation of the risks of work in the occupational health care field. International methods for evaluating the load of patient transfers created for research use (Kjellberg et al. 2000, Johnsson et al. 2004, Radovanovic & Alexandre 2004) were developed to examine specific research problems and are not generally available. The method developed for more extensive evaluation of the risks of nursing work (Battevi et al. 2006) and the methods applicable for assessing the load of nursing work postures (Kemmlert 1995, Hignett & McAtamney 2000) are not available in Finnish either.

The method for evaluating the load of patient transfers has been developed as a practical tool for assessing the load caused by patient transfers. The manual provides justification and content for developing work and work conditions and for personnel training. The guide and form for evaluating patient transfers are freely available for use. The evaluation instructions and form can be printed from the website at www.tyosuojelu.fi/kstsp.

In addition to the authors, many experts from different fields contributed to developing the method for evaluating the load of patient transfers. Our thanks go to the personnel of the Central Finland Health Care District, the hospital district team at Jyväskylän Seudun Työterveys as well as to the members of the Health care sector's transfer ergonomics expert network and Samu Mäkinen, health sciences student. We would also like to thank researcher Leena Tamminen-Peter and Professor Esko Mälkiä for their valuable expert comments. Finally, special thanks go to Anna Tamminen, Occupational Safety and Health Manager at the Central Finland Health Care District, and her staff and to the Finnish Work Environment Fund, which granted the financing that made this project possible.

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1 Load of patient transfers

The physical and mental strain can be very significant in nursing. Work postures and movements in daily nursing work are often awkward and cause strain (Lagerström et al. 1998). The most physically stressful work involves assisting disabled patients, in which case the nurse's lower back is the part of the musculoskeletal system that is subjected to the most stress (Feng et al. 2007). The nursing personnel also feel that patient transfers or hoists are physically the most stressful phase of the work (for example, Hui 2001, Nuikka 2002, Vehmasvaara 2004). Nurses often use old and physically strenuous methods when assisting patients (Tamminen-Peter & Tuomisto 2002, Tamminen-Peter 2002). Furthermore, the nursing personnel's knowledge and use of helping devices and transfer aids has been rather slight (Elford et al. 2000, Siukola et al. 2004).

Approximately 30% of all people working in the health care sector consider the work to be physically stressful, but more than 60% of those doing assisting nursing work feel the same way (Wickström et al. 2000). Weights of 25 kilograms or more are transferred or lifted more often in the social and health care field than in other fields (Piiirainen et al. 2003). According to the statistics of the European Union, the number of work-related accidents in health care is 34% higher than the average in other fields (European Agency for Safety and Health at Work 2004). People doing nursing work also have nearly 30% more sick leaves in comparison to the rest of the working population (Pheasant & Stubbs 1992).

According to Kekkonen (2001), nursing employees in Finland have an average of 17.2 sick leave days per year, which corresponds to the average for municipal employees, 18 days/year (Vahtera et al. 2002). Employees at health centres and old people's homes have the most sick leave days (Wickström et al. 2000). According to Kekkonen (2001), health centre nursing employees have an average of 25.7 and old people's home employees 21.2 days of sick leave. These workplaces also have more long periods of sick leaves exceeding 30 days. For nurses, 16% of sick leaves are due to lower back pain while the corresponding figure for other employees is 8% (Hignett 1996a). Approximately one-third of nurses' sick leaves is caused by patient transfers, and these absences are often of long duration and/or repetitive in nature (Siukola et al. 2004).

The prevalence of nurses' back problems has been demonstrated in numerous studies (Jensen 1990, Gundewall et al. 1993, Smedley et al. 1995, Hignett 1996a, French et al. 1997, Feng et al. 2007). Practical nurses have been discovered to suffer from back pain more often than registered nurses (Hignett 1996b). Recent nursing graduates and nursing students are particularly susceptible to back injuries (Hanhinen et al. 1994). The number of patient transfers and the prevalence of lower back symptoms correlate with each other (Hignett 1996b); nurses that perform a lot of patient transfers have more back problems than other nurses (Smedley et al. 1995, Zhuang et al. 1999). According to one study (Jensen 1990), the risk of back problems among nurses performing a lot of patient transfers is 3.7 times greater than that among nurses performing few patient transfers.

The load of patient transfers could be significantly reduced by means of better ergonomics, patient transfer techniques that utilise new, natural movement models, and better patient transfer skills. According to research information (Tamminen-Peter & Tuomisto 2002, Schibye et al. 2003, Tamminen-Peter 2005), new patient transfer methods are clearly lighter for nurses and more activating and pleasant for patients than traditional methods of assistance. The focus of development with regard to patient transfer ergonomics should move from training at the individual level to more extensive risk assessment and occupational safety-oriented leadership (Fleming & Lardner 2002, Hignett 2005).

2 Legislation on patient transfers

In Finland, the Occupational Safety and Health Act (738/2002) imposes on the employers an obligation to look after their employees' safety and health at work. With regard to patient transfers, the obligation of the Act is further specified by the Government Decision on Manual Lifts and Transfers at Work (1409/1993).

According to the Occupational Safety and Health Act, the employer must analyse the hazards and risk factors caused by the work (section 10), such as the load and risk of accidents resulting from patient transfers in nursing work. There is no standard model for analysing the hazards and risks caused by patient transfers. For example, the risks can be associated with the work environment, task, burden, transfer and lifting technique or specific characteristics of the employee. Patient transfers will always be needed in the social and health care field, but the risk factors that are identified must be removed. As a result, the employer should assess the significance of the risk or hazard resulting from the patient transfers to the safety and health of the employees in the workplace. When specifying the extent of the risk, the probability of the hazardous event and the severity of consequences can be taken into account. The employer can utilise an external expert, such as representatives of the occupational health care, to analyse the risks and hazards. The analysis and assessment should be implemented with the personnel. If the conditions at work/ the workplace change significantly, the risks should be analysed and assessed again.

On the basis of the analyses, the employer must plan, select, dimension and implement such measures that can reduce the risk to employee health. For example, measures aimed at easing patient transfers can be linked to the work environment, such as furniture arrangements in patient rooms and the dimensioning of toilet and shower facilities. In some cases, reducing the load requires the reorganisation of a ward's outdated facility solutions. The employer should also arrange for employees to have access to suitable mechanical equipment or transfer aids to lighten patient lifts and transfers. The work can also be eased by influencing working methods and work arrangements, in other words, the amount and division of work, breaks and work rotation. Planning of changes requires cooperation at the workplace.

The employer must ensure that the employee receives sufficient information on the risk factors involved in patient transfers and sufficient induction and guidance regarding proper working methods and the use of helping devices. For example, occupational health services can be utilised in employee guidance. The guidance should always happen at the workplace, in the right situation and should be supplemented when necessary.

3 Using the method for evaluating the load of patient transfers

In this text, the word patient refers to a health care client or patient and the word nurse refers to health care professionals.

3.1 What is a patient transfer?

The transfer of patients and helping them to move is part of health care work. In this method, a transfer is considered to include all assistance provided to transfer or move a patient that involves manual assistance and/or assistance with helping devices. Lifting of a patient manually or with a mechanical hoist is also included in transfers. Ensuring the safe movement of a patient is not considered to be a patient transfer.

3.2 Selecting and limiting the patient transfers for evaluation

The method for evaluating the load of patient transfers can be used to assess the load at the ward or at individual level. The patient's opinion on the safety and pleasantness of the transfers has been excluded from the method, because this is a method for evaluating the load of work. Factors at the organizational level, such as sufficiency of the personnel and the amount of nursing care required by the patient, have also been excluded, as they cannot be reliably determined by observing and interviewing nurses. For example, evaluating an employee at the individual level can be based on a justified request to investigate the load at work (Occupational Health Care Act 1383/2001, section 12) or a need observed in occupational health care to assess the load on an employee at work.

If the evaluation method is used to assess a patient transfer that was observed or experienced as being particularly strenuous, it must be noted that the result describes the peak rather than the average load of patient transfers performed in the ward or by the employee.

At the ward level, the load of patient transfers can be evaluated after an analysis and assessment of the risks of general work in the ward (Occupational Safety and Health Act 738/2002, section 10). The method can be used for more detailed evaluation of the ergonomic and physical risks of patient transfers that are identified in the risk assessment. In order to obtain a reliable and sufficiently comprehensive picture, the load of patient transfers in the ward should be assessed based on the work of at least five members of the nursing personnel. In a small ward, the patient transfer ergonomics of all those involved in nursing work can be assessed.

3.3 Performing an evaluation

An evaluation of the load of patient transfers is performed by an occupational health care professional or expert trained in the use of patient transfer ergonomics and the method, or by an occupational safety and health representative or other competent person familiar with occupational safety and health and ergonomics, for example, the person responsible for ergonomics at the ward. The method can also be utilised at occupational safety and health inspection visits.

The method for evaluating the load of patient transfers has 15 objects for assessment, the first nine of which are filled in by the evaluator on the basis of observing the nurse and the last six on the basis of an interview with the nurse. Observation of the patient transfer is done in conjunction with the practical work. The nurse performs the patient transfer as usual. The patient is guided and helping devices are used in the normal manner.

The interview questions describe the nurse’s opinion of the general load of patient transfers. The interview questions are asked in a quiet place after the transfer has been completed. The nurse is instructed to answer yes or no depending on which alternative corresponds to the situation more often. It takes the nurse a few minutes to answer the questions. If the same employee is asked to perform several different patient transfers to be assessed, the observation section is filled in separately for each transfer. The employee is asked to answer the interview questions only once.

Videotaping of the patient transfer is recommended. The transfer can be viewed several times and, if necessary, freeze-frames can be used to make the evaluation easier and more reliable than on-the-spot observation. Another benefit of recording is the fact that, with the consent of the nurse and patient, the video can be used later for instructing and guiding the personnel. The environment and features of the work environment are best observed on site.

3.4 Recording observations and notes

Sections 1–9 of the evaluation form are filled on the basis of patient transfer observations and assessed as being in order, partially in order or not in order. All three criteria must be in order before the “in order” column can be marked. If 1–2 of the criteria are in order, the “partially in order” column is marked according to whether 1 or 2 criteria are in order. If no criteria are met, the section being assessed is “not in order”. To help with remembering the criteria, the sub-criteria for several evaluation sections are listed and a response space included for each criteria. The evaluation is easier to perform if each sub-criterion is marked according to whether it is in order (X) or not (-). An example of a completed evaluation form is presented in Appendix 2.

Examples of sub-criteria for evaluation sections

6.	LOAD ON UPPER LIMBS AND TRUNK holding up _____, elbows and shoulders _____, wrists and fingers _____
7.	LOAD ON LOWER BACK flexion_____, rotation _____, body control _____

Any observed deficiencies and other factors to be taken into consideration should be recorded in the space reserved for notes immediately upon observation. It is difficult to remember the observations later. Attributing deficiencies to the person being evaluated should be avoided.

An example of notes

OBJECT OF OBSERVATION	3/3 criteria in order	Partially in order 2/3 or 1/3 criteria		Not in order 0/3 criteria	Notes
1. CONDITIONS IN THE WORK ENVIRONMENT temperature X, draft X, lighting –		X			Dim lightning in the shower facility
2. FEATURES OF THE WORK ENVIRONMENT AND WORKING SHOES sufficiency of space –, adjustability –, traction of the floor and working shoes X			X		Height adjustment of the shower platform not working

3.5 Load index

If necessary, a load index can be calculated on the basis of the results of observations and the interview. This index expresses the relative share of objects that are in order and the criteria that are partially in order in comparison to all the evaluations. The coefficient for objects that are partially in order is 0.67 if 2 criteria are in order. The coefficient is 0.33 if only 1 criterion is in order. The coefficient 0.33 is also used in responses for assessment objects 14 and 15 that are partially in order, because there is only one response option in the partially in order evaluation field for these objects. Objects that are not in order are not taken into account in the top line of the equation, but their number is included in the total number of evaluation objects.

There are a total of 15 objects for evaluation. If a patient hoist is used in the transfer, the total number of evaluation objects is 13 because objects 4 and 5 are excluded from the index (see section 4.3, Use of a patient hoist). The equation for calculating the index has been modified from the Finnish Institute of Occupational Health's method for evaluating workload (Laitinen et al. 2000, Ketola & Laaksonlaita 2004). The information provided by the index figure of the load index is a guideline.

The load index is calculated according to the following equation:

$$\text{INDEX} = \frac{\text{number of in order} + (0.67 \times \text{number with 2 criteria in order}) + (0.33 \times \text{number with 1 criterion in order}^*)}{\text{total number of all responses}} \times 100 = \%$$

* Also includes the 'partially in order' evaluations for items 14 and 15

Appendix 2 contains an example of calculating the load index on the basis of an example form.

Note: When calculating the load index, every observation is equal in terms of value even if their importance in terms of occupational safety and health and ergonomics might not be identical in reality. However, the index level makes it possible to specify a directive operating model for reducing the load of patient transfers. When using the index, it should be noted that the first four objects of observation and the first three interview items are levels required by Finnish legislation or general recommendations, and thus the employer is responsible for ensuring that they are in order.

Interpreting the index:

Over 80%

If the index figure exceeds 80%, the situation in terms of patient transfer ergonomics is good in the evaluated transfers. The evaluator and/or occupational health care representative provide instructions on maintaining and further improving the situation.

60–80%

If the index figure is 60–80%, the load of patient transfers is quite high, and measures to correct the problems identified in the evaluation form should be taken at the workplace.

under 60%

If the index figure is 60%, the employer must take immediate measures to improve ergonomic working methods. The development measures should utilise the input of employees, occupational health care, the occupational safety and health organisation and possibly external experts.

4 Objects of evaluation

A. OBJECTS OF OBSERVATION

4.1 Conditions in the work environment

Observations regarding the conditions in the work environment are:

- 1) *temperature*
- 2) *humidity and air movement*
- 3) *sufficiency of lighting*

The temperature in the working premises should be less than 23 °C for heavy work and less than 26 °C for moderate work. The humidity should be 20–60% with no observable air movement or draft. Lighting is sufficient if there are no shadows, strong contrasts or excess glare in the workspace. If sensory assessments do not appear to be in order, the occupational safety and health organisation or occupational health services have the expertise needed to perform actual measurements.

4.2 Features of the work environment and working shoes

Observations of features of the workspace and working shoes are:

- 1) *sufficiency of space*
- 2) *adjustability*
- 3) *traction of the floor and working shoes*

The assistant must have enough space to perform the transfers and to use the helping devices, so that, for example, the walls or fixed furnishings do not restrict the transfers. In Finland, specific directive dimensions regarding the space needed in a patient room do not exist. For example, according to a European risk assessment method (Battevi et al. 2006), there should be at least 90 cm of space between the bed and the wall or between beds, and at least 120 cm at the end of the bed.

If several observations are made, the accessibility of assistance in toilet and shower facilities should be a particular focus. Assistance in relatively small washing or toilet facilities can be successful if the furnishings and support bars are well placed. Illustrative information on the space required in washing facilities and support bars is available on the website of the City of Helsinki's functional home project at (<http://www.hel2.fi/Sosv/toimivakoti/toimivakoti5/peseytyminen.htm>).

The employee should be able to easily adjust the dimensions of the workspace, for example, the height of the bed or shower platform, to suit him/herself and the patient. If there is more than one assistant, the suitable height is determined according to the shortest employee involved, in which case the other employees adjust their work posture by lowering the point of gravity of their bodies, in other words, by taking a wider offset feet position and bending the knees more.

The floor should have good traction and be clean, and there should not be any excess items or cords to interfere with movement and to endanger occupational and patient safety. The employee's working shoes should provide good traction and be appropriate for the work (Government Decision 1409/1993), which means that indoor working shoes have a heel strap and an antiskid sole. Appropriate footwear should be used in shower facilities, which in practice means rubber boots.

4.3 Need for and use of a patient hoist

The need for and use of a patient hoist is in order when

- 1) *the ward/workplace has a mechanical hoist available when necessary*
- 2) *patient transfer is performed mechanically OR
the use of a hoist is not necessary because of the patient's degree of independence*
- 3) *the hoist is used safely and appropriately OR
the hoist is not needed due to the patient's degree of independence*

Each ward should have a mechanical hoist available if necessary. Finnish legislation or occupational safety and health guides do not specify a clear limit for the maximum weight of patients or burdens being transferred or when a patient hoist should be used, so the assessment of the need for a hoist is subjective performed by an expert. If the patient does not bear weight on his/her lower limbs, a hoist should be used. In particular, employees that are disabled or pregnant should avoid heavy lifting.

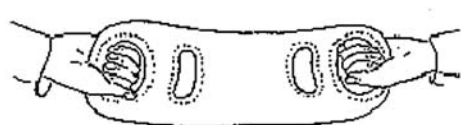
Note: Objects 4–5 are not evaluated if a mechanical hoist is used in the transfer.

4.4 Need for and use of non-mechanical transfer aids

The need for and use of small aids is in order when

- 1) *the ward has aids to lighten the transfer*
- 2) *the aids are appropriate*
- 3) *the aids are used correctly and in an appropriate manner OR
their use to lighten the transfer is unnecessary*

Objects other than actual aids can be used to lighten the transfers, for example, a sturdy chair that the patient can lean on when moving from a bed to a wheelchair. A friction-increasing material (= non-slip device) should be placed under the patient's feet when moving a patient up in a bed if the patient is able to push with their leg muscles. If the patient is not able to push with their lower limbs, low-friction material should be placed under their feet to reduce friction during the transfer.

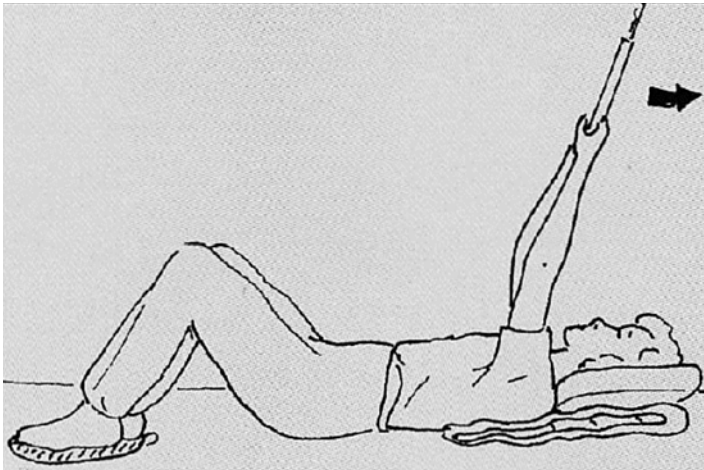


Handling sling



Handling belt

Non-mechanical aids to lighten patient transfers include a handling belt, slide board, handling sling and non-slip devices (Tamminen-Peter et al. 2007).



Friction-increasing material under the feet and friction-reducing material under the trunk. (Tamminen-Peter & Wickström 1998.)

4.5 Transfer distance and transfer height

Patient transfers should be performed so that the transfer distance is as short as possible and the transfer height makes ergonomic work postures possible (see the next three evaluation objects).

This evaluation object is in order when

- 1) *there is no need to take steps when bearing the patient's weight during the transfer*
- 2) *the transfers take place between the knee-elbow level*
- 3) *the employee does not have to reach with his/her upper limbs during the transfer*

The knee-elbow level refers to the height of these joints in the standing position, with the upper limbs beside the body. Note: Ensuring the safe movement of a patient is not considered to be a patient transfer.

4.6 Load on upper limbs and trunk

The load on the upper limbs and trunk is within the allowable limits if

- 1) *the duration of the patient-carrying phases in patient transfers only lasts a few seconds*
- 2) *the elbows are close to the body and the shoulders low when carrying the patient*
- 3) *the wrists are not strongly bent and it is not necessary to squeeze strongly with the fingers*

Evaluating muscle tension in the shoulders can be difficult, but the shoulder muscles are usually tense if the elbows are far away from the body.

4.7 Load on lower back

The lower back is one of the body parts subjected to the most strain during patient transfers. This evaluation object is in order when

- 1) *the nurse's back is in a natural upright position during the transfer or the body is bent forward at an angle of less than 45 degrees in relation to the vertical level*
- 2) *the transfers have a maximum back rotation movement of 15 degrees*
- 3) *the assistant's body is in a controlled position throughout the transfer*

For reasons of clarity, the forward flexion of the nurse's back is assessed in relation to the vertical level (a straight line upwards). In more detailed evaluation of work postures, an occupational physiotherapist can assess the positions of the back in relation to the hip joint angles. During transfers, a maximum permitted back rotation movement is 15 degrees when the shoulders and knees-feet are not aligned. The back rotation movement should be distinguished from a pelvic rotation movement done with the help of weight transfer in which the shoulders and knees-feet are aligned. The nurse's back is not in a controlled position if the transfer is performed, for example, by wrenching or with a rounded lower back.

4.8 Load on lower limbs

When evaluating the load of transfer situations, the lower limbs may receive less attention if the evaluator focuses on assessing the positions of the trunk and the back. However, strain on the lower limbs can be significantly reduced in transfer situations if

- 1) *transfers are performed in the offset feet position using the nurse's weight transfer and muscle force in the lower limbs*
- 2) *the nurse's knees and feet are aligned*
- 3) *no work is done on the knees or in a squat during transfers*

The evaluation for this object is partially in order if, for example, the nurse's knees turn inward when squatting. Patient work may require short-term work in a squat or on the knees, for example, when helping a patient put on shoes, but this phase is not evaluated as a transfer.

4.9 Transfer skills and smoothness of transfer

Evaluation of a nurse's transfer skills and of the overall smoothness of the transfer is challenging and should be performed so that the nurse does not feel that his/her professional skill is being criticised. This assessment object is in order when

- 1) *the patient is guided and activated to transfer as needed, either verbally and/or by means of touch*
- 2) *the grips do not prevent the patient's own activeness*
- 3) *the transfer supports the patient's normal moving and use of natural movement patterns*

Guidance and activation of the patient take place according to the situation, for example, activating by means of touching the patient's thigh when he/she is rising from a sitting to a standing position. The grips must not prevent movement that is important to the transfer. For example, a nurse's grips must not prevent the knee from moving forward as the patient rises from a sitting to a standing position. For example, a grip under the arm prevents the patient from using his/her upper limbs. The grips must not cause pain to the patient.

For example, the use of natural movement patterns means that when getting to their feet, the patient should be able to flex their trunk forward and bring the feet under the body's point of gravity (often the patient's legs are too far forward). If necessary, the expertise of an occupational physiotherapist or the ward physiotherapist and the Structure of the Observed Patient Movement Assistance Skill (SOPMAS) can be used to evaluate the use of natural movement patterns and transfer skills (Tamminen-Peter & Hantikainen 2005).

B. INTERVIEW QUESTIONS FOR THE NURSE

4.10 Guidance in work postures

The Occupational Safety and Health Act (738/2002, section 14) obliges the employer to ensure that employees are provided with orientation to their work and that the instruction and guidance provided to employees be supplemented when necessary. This evaluation object is in order when

- 1) *the employee has received orientation and the opportunity to practice transfer methods in his/her present workplace*
- 2) *the employee has attended patient transfer training during the past two years*
- 3) *the employee feels that he/she is aware and capable of using good work postures during patient transfers*

If an employee has been at work for less than two years and has received orientation and practice in transfer methods at the workplace, the response to the second criterion (question 2) is also considered to be in order. Practicing patient transfers among employees is also considered to be training; an external trainer is not always necessary.

The supervisor should be questioned on a ward- or workplace-specific basis regarding whether a record is kept of personnel participation in training and refresher training.

4.11 Use of patient transfer equipment and guidance in their use

This evaluation object is in order when

- 1) *the employee has received guidance in the safe use of mechanical and other helping devices at this workplace*
- 2) *the workplace has an agreed practice for repair and maintenance situations regarding the equipment*
- 3) *the employee knows how to use all the helping devices at the ward/workplace*

If the employee is not aware of the workplace practice concerning notification of faulty equipment, the communication regarding this matter has clearly been insufficient. The supervisor should be questioned about this matter when examining ward-level results.

The use, user guidance and maintenance of equipment are provided for in the Occupational Safety and Health Act (738/2002, sections 14 and 41) and the Medical Devices Act (1505/1994, sections 11–13).

4.12 Work arrangements

Issues relating to the organisation of work can significantly reduce the mental strain and physical load on employees at work. With regard to patient transfers, this evaluation object is in order when

- 1) *the lunch and refreshment breaks planned for the work shift are realised*
- 2) *if necessary, the employee receives assistance with patient transfers on all work shifts*
- 3) *the employee can stop the work in order to take a short recovery break*

Provisions on the organisation of work can be found in the Occupational Safety and Health Act (738/2002, sections 13, 14, 31) and the Government Decision Concerning Manual Lifts and Transfers at Work (1409/1993). If there seems to exist strain factors relating to the control of workload and the organisational culture in the workplace, determining these factors by using an independent investigation method is recommended (e.g. Elo et al. 2006). For example, the amount of nursing care required by the patient has to be taken into account when determining the number of employees needed.

4.13 Mental strain of patient transfers

The mental strain of patient transfer situations is in order when

- 1) *implementation of the transfer situations is planned in advance*
- 2) *patient transfers are mainly unhurried*
- 3) *the employee does not have to work alone on any work shift*

The above criteria are also the foundation for patient safety.

4.14 Physical load of patient transfers

The average physical load of patient transfers is classified as follows:

- *In order: The nurse feels that the patient transfers are light or rather light*
- *Partially in order: The patient transfers are moderately or quite heavy physically*
- *Not in order: The patient transfers are physically very heavy*

4.15 Frequency of manual patient transfers

The frequency of patient transfers is evaluated for those transfers where the muscle force required by the nurse exceeds the strength needed to transfer a weight of 15 kg. In practice, this is nearly always exceeded when an adult patient needs plenty of help when being assisted or transferred. The responses are classified as follows:

- *In order: The number of patient transfers requiring muscle force (more than 15 kg) is less than six per work shift*
- *Partially in order: The number of patient transfers requiring muscle force (more than 15 kg) is less than 12 per work shift or exceeds 12 per work shift in rare cases*
- *Not in order: The number of patient transfers requiring muscle force (more than 15 kg) is 12 or exceeds 12 per work shift*

5 Measures after evaluation

The objective of evaluating the load of patient transfers is to improve working methods and conditions. The method helps to provide an overall view of the risk to personnel health or safety caused by patient transfers. Furthermore, the method can help to identify concrete development targets that can be addressed to influence factors including the load at work, musculoskeletal symptoms, accident frequency and well-being at work. Responsibility for the personnel's working conditions lies with the employer, but development work requires cooperation between supervisors, personnel, occupational safety and health organisation, and occupational health services. The development plans must have an implementation schedule and a person in charge.

5.1 Providing notification of the results

Communication of ward-level results should be comprehensive enough to ensure that employees that did not participate in the evaluation also receive information on the working methods that require development. The ward-level results of an evaluation of the load of patient transfers should be reviewed with the employees, supervisor and, if necessary, representatives of occupational health care and occupational safety and health organisation. However, the results of an individual employee or a transfer recorded on video may not be shown without the consent of the people in the video. If a patient can be identified in the video, the patient must provide written consent for recording and use of the tape. Examples of the consent forms for the patient (Appendix 3) and the nurse (Appendix 4) are included at the end of this guide.

If the background for evaluating the load of patient transfers is a detailed project to assess the load of work that was initiated by occupational health care, the results can be reviewed with the employee, supervisor and occupational health care representatives.

5.2 Measures at the upper management level

The results of an evaluation of the load of patient transfers should be communicated in an appropriate manner to the workplace organisation level, in other words, upper management. The upper management must be aware of the hazards and risk factors involved in practical work and problems relating to patient transfers, because the development measures that cannot be implemented at the work unit level must be resolved by the upper management.

The final responsibility for personnel health and safety lies with the upper management, which provides the human and financial resources needed for development and decides on the implementation schedules for the plans. The management must have access to reliable and systematically collected material to provide the foundation for longer term planning and larger investments to develop work and working conditions. For this reason, ongoing dialogue between the upper management and the workplace level is essential.

5.3 Measures at the work unit level

Many measures to reduce the load of patient transfers are taken at the work unit level. Some of the development measures identified in the evaluation are such that they should be part of the normal daily routine at the work unit, and are thus the responsibility of everyone. For example, operating methods related to cleanliness and tidiness or the maintenance of equipment and aids should be clearly agreed upon. Some measures may require a separate project with objectives and a plan. The results of the project

must be monitored and evaluated. The measures should be recorded in the work unit's development and training plans and possibly in the occupational safety and health action plan for the workplace. The following sections provide some examples of issues that may require development.

Patient's need for help and placement of furnishings and helping devices

The shortage of space in patient rooms and toilet and bath facilities may significantly increase the load on nurses caused by patient transfers. Patient placement in the wards should take into consideration the patient's need for helping devices and the space required for their use. Patient rooms may also contain unnecessary material that further contributes to the lack of space. Arrangement of furnishings and support bars in the workspace should be planned in a patient-oriented manner and from the perspective of safe assistance.

Practicing the use of a patient hoist

A mechanical patient hoist should be available in each ward where physically strenuous patient transfers are performed. All nursing personnel should know how to use the hoist safely. Internal training must ensure that every nurse has experience of using the hoist and of being a 'patient'. If only one patient in the ward requires a hoist for transfer, it should be possible to store the hoist in the patient's room. Lift slings designed for patients of different sizes should be purchased for the ward/workplace (usually available in sizes S–XL).

Use of non-mechanical transfer aids

Small transfer aids should be easily and quickly available to nursing personnel in order to make their use as simple as possible. It is advisable to list the available aids and agree on their storage places. Aids suitable for assisting the patient, such as a handling belt, should be kept in the patient's room. Representatives of transfer aid companies should examine the possibility for trial use of the devices before the purchase decision. Occupational health services can provide assistance and expertise regarding the selection of helping devices.

In addition to the actual aids, the maintenance personnel can make suitable pieces of non-slip material from goods available at plastics shops and sliding material from low-friction fabrics. It is essential to also ensure the suitability, durability and safety of aids and sliding materials made by the personnel.

Inspecting the condition of equipment and aids and their maintenance

Checking the condition of equipment and aids is the responsibility of everyone who uses them. The work units should clearly agree on how an employee should react upon noticing a broken piece of equipment or aid. The issues to be agreed are: who should be informed on the fault, who takes the device for maintenance, who performs the maintenance work, and how the work unit is notified of the measures taken to repair the devices.

Monitoring of orientation and training

Every person doing nursing work must receive orientation and refresher information about the lightest transfer techniques. A written document regarding implementation of the orientation is recommended. Monitoring of training plan implementation ensures that all nurses have received instruction and guidance and that everyone has basic patient transfer information and skills.

Adopting ergonomic working methods

Nurses should be motivated, for example, by the person responsible for ergonomics to examine their own work postures and actively develop their transfer techniques. Mere theoretical patient transfer training is not sufficient to change working methods, because learning motor skills and unlearning old transfer methods can only be accomplished through practical repetition.

Transfer skills

Many employees in the health care field are unfamiliar with using the natural movement patterns of basic motion. Nurses should observe and practice how their co-workers turn over in bed or rise to a sitting position from the bed. Understanding movement patterns is essential to using assisting techniques to support a patient's resources. For example, pictures made by a physiotherapist of the method for turning or otherwise moving a patient may be of assistance in the rehabilitative care of a patient. The pictures are placed near the patient's bed so that all nurses can use the same method of assistance.

5.4 Measures at the individual level

If patient transfers are evaluated for an employee from individual starting points, he/she should receive personal feedback on the results of the evaluation. In addition to the supervisor, representatives of occupational health care and the occupational safety and health organisation can also be present at the feedback discussion. The work can be made lighter by means of individual work arrangements, such as changing working time, increasing the number of breaks, pair work, more efficient use of helping devices, and developing transfer techniques. Development of transfer techniques and better use of helping devices requires personal guidance and monitoring.

Employee's working capacity

When planning work shifts, the nurses' physical capacity to perform their work should be taken into consideration whenever possible. The work of disabled and pregnant employees should be made lighter and consideration given to whether the employee can work on a night shift.

6 Testing and piloting of the form

The usability and repeatability of the form for evaluating the load of patient transfers has been tested in four surgical wards in the Central Finland Health Care District. Three occupational physiotherapists and occupational safety and health representatives took part in the evaluations and assessed videotaped patient transfer situations at one-week intervals. The intra-observer and inter-observer repeatability results in the first pilot study were mainly good or excellent for the same evaluator and between different evaluators. Satisfactory repeatability was achieved with the transfer distance and height, lower back load and transfer skills and transfer smoothness. (Karhula et al. 2006.)

On the basis of the first pilot study and expert comments, the method was developed, particularly in terms of specifying the evaluation criteria for the sections with satisfactory repeatability, such as transfer distance and height in the objects of observation and the lower back load. The number of evaluation criteria was set at three. Furthermore, space for filling in the evaluator's notes concerning the sub-criteria was added to the evaluation form.

A second pilot study was carried out in the X-ray department at Central Finland Central Hospital, where the more developed version of the form was used for evaluating patient transfers. Both the observation performed on site and the evaluation on the basis of a video after a one-week interval produced very similar results. Twelve of the reproducibility results were excellent and two were good. Evaluation of the load on the back was the only object to receive a satisfactory rating for reproducibility. After the second pilot study, the form was further specified with verbal instructions concerning the evaluation criteria for the load on the lower back. The usability of the load index is good for the equation in this version, because the index results corresponded to the expert evaluations performed for the overall load of transfers.

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Evaluation form • APPENDIX 1

FORM FOR EVALUATING THE LOAD OF PATIENT TRANSFERS

Observed transfer: _____ Workplace and workstation: _____
 Employee's profession: _____ Gender of employee: F M Age of employee: _____
 Evaluator: _____ Date: ____/____/____

EVALUATION INSTRUCTIONS

- Observe a typical patient transfer performed by the employee in which the patient requires assistance
- After each assessment object sub-criterion, record whether the sub-criterion in question is in order (x) or not (line).
- On the basis of the sum of the sub-criteria in the vertical columns, use a tick to mark whether the matter is in order (3/3), partially in order (2/3 or 1/3) or not in order (0/3).

OBJECTS OF OBSERVATION	IN ORDER 3/3 criteria	PARTIALLY IN ORDER 2/3 or 1/3 criteria	NOT IN ORDER 0/3 criteria	NOTES
1. CONDITIONS IN THE WORK ENVIRONMENT Temperature _____, draft _____, lighting _____				
2. FEATURES OF WORK ENVIRONMENT AND WORKING SHOES Sufficient space _____, adjustability _____, suitability of floor and working shoes				
3. NEED FOR AND USE OF PATIENT HOIST Equipment available _____, appropriateness _____, used correctly/not needed _____				
4. NEED FOR AND USE OF NON-MECHANICAL TRANSFER AIDS Equipment available _____, appropriateness _____, used correctly/not needed _____				
5. DISTANCE AND HEIGHT OF TRANSFER No steps _____, knee-elbow level _____, no reaching _____				
6. LOAD ON UPPER LIMBS AND TRUNK Holding up _____, elbows and shoulders _____, wrists and fingers _____				
7. LOAD ON LOWER BACK Flexion _____, rotation _____, body control _____				
8. LOAD ON LOWER LIMBS Weight transfer and muscle force _____ knees-feet alignment _____, no squatting/on knees _____				
9. TRANSFER SKILLS AND TRANSFER SMOOTHNESS Guidance/facilitation _____, grip _____, transfer skills _____				

Evaluation form • APPENDIX 1

INTERVIEW QUESTIONS FOR THE EMPLOYEE	in order	partially in order	not in order	notes
<p>10. GUIDANCE IN WORK POSTURES</p> <p>1) Have you received orientation and guidance at this workplace regarding ergonomic work postures and movements? Yes (Y) No (N)</p> <p>2) Have you taken part in patient transfer training in the past two years? Y N</p> <p>3) Do you master good work postures during patient transfers? Y N</p>				
<p>11. USE OF PATIENT TRANSFER EQUIPMENT AND GUIDANCE IN THEIR USE</p> <p>1) Have you received guidance at this workplace in the use of helping devices? Y N</p> <p>2) Does the workplace have an agreed repair and maintenance practice for the equipment? Y N</p> <p>3) Do you know how to use all the helping devices in the ward/workplace? Y N</p>				
<p>12. WORK ARRANGEMENTS</p> <p>1) Are the work shift breaks carried out as planned? Y N</p> <p>2) Do you receive assistance in patient transfers on all shifts if necessary? Y N</p> <p>3) Can you stop work to take a short recovery break? Y N</p>				
<p>13. MENTAL STRAIN OF PATIENT TRANSFERS</p> <p>1) Are the transfer situations planned in advance? Y N</p> <p>2) Are the transfer situations mostly unhurried? Y N</p> <p>3) Is there more than one employee on all shifts? Y N</p>				
<p>14) PHYSICAL LOAD OF PATIENT TRANSFERS</p> <p>In your opinion, are the patient transfers a) physically light or quite light, b) moderately heavy or quite heavy or c) very heavy?</p>	a)	b)	c)	
<p>15. FREQUENCY OF MANUAL PATIENT TRANSFERS</p> <p>How many manual (over 15 kg assistance) patient transfers do you perform on average during a shift? a) < 6, b) 6-12, c) > 12</p>	a)	b)	c)	
TOTAL				

Instructions for calculating the index:

- Add up the number of ticks in the 'in order' and 'partially in order' columns and then add up the total number of ticks in all the columns.
- Place the responses for the 'in order' items in the equation. The number of 'partially in order' responses in the equation are multiplied by the standard value of 0.67 or 0.33, depending on whether two or one criteria are 'in order'.
- Divide the resulting sum by the total number of responses and multiply by 100.

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$\frac{\text{number of in order} + (0.67 \times \text{number with 2 criteria in order}) + (0.33 \times \text{number with 1 criterion in order}^*)}{\text{total number of responses}} \times 100 = \%$	$+ (0.67 \times \text{)} + (0.33 \times \text{)} \times 100 = \%$	$< 60\%$	$60-80\%$	$> 80\%$
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* Also includes the 'partially in order' evaluations for items 14 and 15

OBJECT OF OBSERVATION	EVALUATION PRINCIPLES
In order: 3/3 criteria in order, Partially in order: 1-2 criteria in order, Not in order: 0 criteria in order	
1. CONDITIONS IN THE WORK ENVIRONMENT	<p>Criteria: 1) The temperature in the work environment is under 23°C (under 26°C for moderately heavy work). 2) No observable air movement (=draft), humidity is 20-60%. 3) Lighting is sufficient, no shadows or excess glare in the work environment.</p>
2. FEATURES OF THE WORK ENVIRONMENT AND WORKING SHOES	<p><i>Note: Pay particular attention to the toilet and shower facilities as well as the door openings.</i></p> <p>Criteria: 1) The assistant has enough space to perform the transfers and use the helping devices, for example, the walls/furniture do not impede transfers. 2) The employee can easily adjust the dimensions of the work environment, for example, bed height, to suit him/her. 3) The floor/ground provides good traction and the working shoes have good traction and are appropriate.</p>
3. NEED FOR AND USE OF PATIENT HOIST	<p><i>Note: If a hoist is used in the transfer, do not evaluate items 4-5.</i></p> <p>Criteria: 1) A mechanical patient hoist is available. 2) The transfer is performed using the hoist OR the hoist is unnecessary due to the patient's degree of independence. 3) The hoist is used safely and appropriately OR the hoist is not needed in the transfer.</p>
4. NEED FOR AND USE OF NON-MECHANICAL TRANSFER AIDS	<p><i>For example, slide board, handling or turning sling, non-slip device</i></p> <p>Criteria: 1) Aids to lighten the transfer are available. 2) The aids are appropriate. 3) The aids are used correctly and in an appropriate manner OR their use to lighten the transfer is unnecessary.</p>
5. TRANSFER DISTANCE AND TRANSFER HEIGHT	<p>Criteria: 1) There is no need to take a step during the transfer while bearing the patient's weight. 2) The transfers take place between the assistant's knee-elbow level. 3) The employee does not need to stretch with his/her upper limbs during the transfer.</p>
6. LOAD ON UPPER LIMBS AND TRUNK	<p>Criteria: 1) The patient carrying phase only lasts for a few seconds. 2) When carrying, the elbows are close to the trunk and the shoulders low. 3) The wrists are not strongly bent, and it is not necessary to squeeze with the fingers.</p>
7. LOAD ON LOWER BACK	<p>Criteria: 1) During the transfer, the nurse's back is in a natural upright posture or the trunk is flexed at less than 45° in relation to the vertical plane. 2) There is almost no rotation during the transfer (less than 15°). <i>Note: The rotational movement of the pelvis must be distinguished from mere back movement.</i> 3) The assistant's trunk is in a controlled posture throughout the transfer (for example, no wrenching movement or rounded upper back posture).</p>
8. LOAD ON LOWER LIMBS	<p>Criteria: 1) The transfers are performed in the offset feet position using the nurse's weight transfer and muscle force. 2) The knees and feet are in line. 3) The nurse does not work on the knees or in a squat during the transfer (helping the patient put on his/her shoes is not classified as a transfer).</p>

Evaluation form • APPENDIX 1

9. TRANSFER SKILLS AND TRANSFER SMOOTHNESS	<p>Criteria: 1) The patient is guided and activated to transfer, either verbally and/or by means of touch. 2) The grips do not prevent the patient's own activity (for example, a grip under the arm prevents the patient from using his/her upper limbs). 3) The assistant's transfer skills promote the patient's normal movement; in other words, the use of natural movement models.</p>
<p>INTERVIEW QUESTIONS FOR THE EMPLOYEE</p>	
<p>In order: 3 yes answers, Partially in order: 1-2 yes answers, Not in order: 0 yes answers.</p>	
10. GUIDANCE IN WORK POSTURES	<p>Criteria: 1) The employee has received guidance/orientation at this workplace in ergonomic transfer techniques. 2) The employee has taken part in patient transfer training during the past two years. 3) The employee knows how to use all the aids in the ward/workplace.</p>
11. USE OF PATIENT TRANSFER EQUIPMENT AND GUIDANCE IN THEIR USE	<p>Criteria: 1) The employee has received guidance at this workplace in the safe use of aids. 2) The workplace has an agreed repair and maintenance practice for the equipment. 3) The employee knows how to use all the aids in the ward/workplace.</p>
12. WORK ARRANGEMENTS	<p>Criteria: 1) The breaks planned for the shift are carried out 2) The employee receives assistance with patient transfers on all shifts. 3) The employee can stop the work to take a short recovery break.</p>
13. MENTAL STRAIN OF PATIENT TRANSFERS	<p>Criteria: 1) The transfer situations are planned in advance. 2) The transfers are mostly unhurried. 3) There is more than one employee on the shift (no working alone).</p>
<p>In order: response option A, Partially in order: response option B, Not in order: response option C.</p>	
14. PHYSICAL LOAD OF PATIENT TRANSFERS	<p>Criteria: A) The patient transfers are physically light or quite light. B) The patient transfers are moderately heavy or quite heavy. C) The patient transfers are physically very heavy.</p>
15. FREQUENCY OF MANUAL PATIENT TRANSFERS	<p>Criteria: A) The number of patient transfers using muscle force (over 15 kg) is less than 6/day. B) The number of patient transfers using muscle force (over 15 kg) is less than 12/day, or very rarely more than 12/day. C) The number of patient transfers using muscle force (over 15 kg) is 12/day or more than 12/day.</p>

Interpretation of the index:

- If the index figure exceeds 80%, the work arrangements are in order for the most part.
- When the index is 60–80%, the workplace should take measures to correct the problems that were identified in the evaluation form.
- If the index is less than 60%, the workplace must take immediate measures to improve the working conditions.

Example of completing • APPENDIX 2

OBJECT OF OBSERVATION	IN ORDER 3/3 criteria	PARTIALLY IN ORDER 2/3 or 1/3 criteria	NOT IN ORDER 0/3 criteria	NOTES
1. CONDITIONS IN THE WORK ENVIRONMENT Temperature X, draught X, lighting ---		X		Dim lighting in shower space
2. FEATURES OF WORK ENVIRONMENT AND WORKING SHOES Sufficient space ---, adjustability ---, traction of working shoes X		X		Height adjustment of shower platform doesn't work
3. NEED FOR AND USE OF PATIENT HOIST Equipment available X, appropriateness X, used correctly/not needed X	X			
4. NEED FOR AND USE OF NON-MECHANICAL TRANSFER AIDS Equipment available X, appropriateness X, used correctly/not needed X	X			
5. DISTANCE AND HEIGHT OF TRANSFER No steps X, knee-elbow level X, no reaching X	X			
6. LOAD ON UPPER LIMBS AND TRUNK Holding up X, elbows and shoulders X, wrists and fingers X	X			
7. LOAD ON LOWER BACK Flexion---, rotation X, body control X		X		Employee has strong flexion in the back, shower platform is too low (see object 2)
8. LOAD ON LOWER LIMBS Weight transfer and muscle force X, knees-feet alignment X, no squatting/on knees X	X			
9. TRANSFER SKILLS AND TRANSFER SMOOTHNESS Guidance/activation---, grip X, transfer skills---		X		Patient not activated verbally, nor does he/she get involved in the transfer
INTERVIEW QUESTIONS FOR THE EMPLOYEE	IN ORDER	PARTIALLY IN ORDER	NOT IN ORDER	NOTES
10. GUIDANCE IN WORK POSTURES 1) Have you received orientation and guidance at this workplace regarding ergonomic work postures and movements? Yes (Y) No (N) 2) Have you taken part in patient transfer training in the past two years? Y N 3) Do you master good work postures during patient transfers? Y N	X			

Example of completing • APPENDIX 2

<p>11. USE OF PATIENT TRANSFER EQUIPMENT AND GUIDANCE IN THEIR USE 1) Have you received guidance at this workplace in the use of helping devices? Y N 2) Does the workplace have an agreed repair and maintenance practice for the equipment? Y N 3) Do you know how to use all the helping devices in the ward/workplace? Y N</p>		X		
<p>12. WORK ARRANGEMENTS 1) Are the work shift breaks carried out as planned? Y N 2) Do you receive assistance in patient transfers on all on shifts if necessary? Y N 3) Can you stop the work to take a short recovery break? Y N</p>	X			(assistance available night shifts from the medical orderly on duty in the lobby)
<p>13. MENTAL STRAIN OF PATIENT TRANSFERS 1) Are the transfer situations planned in advance? Y N 2) Are the transfer situations mostly unhurried? Y N 3) Is there more than one employee on all shifts? Y N</p>			X	
<p>14. PHYSICAL LOAD OF PATIENT TRANSFER In your opinion, are the patient transfers a) physically light or quite light, b) moderately heavy or quite heavy or c) very heavy?</p>	a)	b) X	c)	
<p>15. FREQUENCY OF MANUAL PATIENT TRANSFERS How many manual (over 15 kg assistance) patient transfers average do you perform on during a shift? a) < 6, b) 6-12, c) > 12</p>	a) X	b)	c)	
TOTAL	8	2	4	1

$$\text{INDEX} = \frac{\text{number of in order} + (0.67 \times \text{number with 2 criteria in order}) + (0.33 \times \text{number with 1 criterion in order}^*)}{\text{total number of responses}} \times 100 = \%$$

*Also includes the 'partially in order' evaluations for items 14 and 15

The load strain index for the results of the example form above:

$$\text{INDEX} = \frac{8 + (0.67 \times 2) + (0.33 \times 4)}{15} \times 100 = 71 \%$$

APPENDIX 3 • Patient consent form

PATIENT'S CONSENT TO PARTICIPATE IN THE EVALUATION OF THE LOAD OF PATIENT TRANSFERS

I have been informed about the purpose and contents of the evaluation of the load of patient transfers. I can cancel or refuse my participation in the video recording at any point of the evaluation if I wish. The personal data of the patient will not be connected to the evaluation of the load on the nurse in any way.

I consent to be video recorded as a patient in a patient transfer situation.

Date

Signature of the patient to be video recorded

I allow the above-mentioned video to be used in the personnel training.

Date

Signature of the patient to be video recorded

Date

Signature of the recorder

APPENDIX 4 • Nurse consent form

EMPLOYEE'S CONSENT TO PARTICIPATE IN THE EVALUATION OF THE LOAD OF PATIENT TRANSFERS

I have been informed about the purpose and contents of the evaluation of the load of patient transfers. I consent to be video recorded in a patient transfer situation. I can cancel or refuse my participation in the video recording at any point of the evaluation if I wish.

I consent to be video recorded in a patient transfer situation.

Date

Signature of the employee

I allow the above-mentioned video to be used in the personnel training.

Date

Signature of the employee

Date

Signature of the recorder