The Challenge of Early Mobilization on the Intensive Care Unit: The Ergonomic Opportunities and Barriers

Hanneke JJ Knibbe [a], Nico E. Knibbe[a] and Elly Waaijer[b]

[a] LOCOmotion Research in Health Care
Brinkerpad 29, 6721WJ Bennekom
The Netherlands

[b]WaaijerConsult
Care Research and Consultancy Department,
Amsterdam, The Netherlands

ABSTRACT

In recent years ICU-care and ICU-management of the critically ill patient is paying more attention to long term effects of the stay on the ICU and of the negative consequences of immobilization, long periods of bed rest, mechanical ventilation and medication aimed at pain reduction and sedation. Immobilization in bed affects practically all body conditions within a very short time frame: ranging from less than an hour to a few days. Some of these effects are reversible, some are not and may result in negative long term effects of the stay on the ICU. Recently new devices and equipment have been developed that enable mobilization of ICU patients at an extremely early stage, even without the patient being aware of being mobilized and being ventilated. This so-called Early Mobilisation (EM) has shown to be safe, feasible and improves outcomes both in the short term and especially also in the long run. There is a gradually building body of knowledge demonstrating the positive effects. In spite of these positive developments mobilizing critically ill and very passive patients in the complicated and often crowded ICU environment is also a first degree ergonomic challenge. Currently occupational musculoskeletal disorders are already prevalent in an ICU environment among nurses and physical therapists across the world. Lifting, assisting and supporting these complicated patients often attached to monitoring and (live) supportive equipment 24 hours a day can be very strenuous. EM requires considerable additional effort from these workers. These ergonomic implications will need to be resolved if an EM policy is to be successfully implemented. Therefore a study was undertaken describing the current situation and the potential of EM for the ICU's in Dutch hospitals. The results indicate a whole array of different descriptions of EM and a lack of consensus, the lack of sufficient and adequate equipment especially when it comes to ergonomic considerations for the nurses, a lack of knowledge of what is required for EM and a lack of up-to-date protocols indicating safe procedures for both patient and nurse. Nevertheless most nurses are convinced of the need for and relevance of EM and see opportunities there. However: they are mostly focused on the patient side of EM and have not sufficiently analyzed the potential consequences for their own health.

Keywords: ergonomics, occupational health, ICU, lifters, early mobilization.

INTRODUCTION

In spite of efforts in hospitals in the Netherlands ergonomic problems remain to be a challenge on the majority of ICU's. The Dutch health and safety inspectorate reports that in 55% of the Dutch ICU's substantial ergonomic risks were present to such a degree that urgent improvements were required and follow-up inspections were needed (Jol et al., 2008). On ICU-units 70% of the nurses report musculoskeletal disorders over the previous past 12 months which is not uncommon in reports on ICU's in other countries (Knibbe and Geuze, 2003-2006, Sun et al., 2007, Ovayolu et al., 2014). The high frequency of bending and twisting and transferring patients in bed contribute to the high

prevalence of occupational low back pain in nurses.
When a new strategy to improve care is implemented in such a vulnerable situation, it is imperative to think ahead of the ergonomic implications for care personnel. Early Mobilization is such a promising improvement for critically ill patients, but the ergonomic impact must be considered as well. It is evident f.e. that in the past physical therapists could not provide this kind of very early mobilization care due to physical constraints, medical issues en ergonomics concerns. Now that the responsibility for early mobilization is shared between physical therapists and nursing personnel it is even more relevant to study the impact from an ergonomic perspective and not only from a clinical perspective for the patient.

Examples of early mobilisation (Schömig, 2008 (left) and Gosselink et al., 2011)

Bed rest in the ICU has negative consequences. Even within hours many body systems are affected as a direct result of the immobility associated with the illness in addition to the direct consequences of the illness itself. All bodily systems may become affected. Some of these changes are reversible, but some of them are not underlining the importance of early mobilization. In the literature examples are presented of patients being mobilized on adapted bicycles without actually being aware of this (Dueck et al., 2010, Gosselink et al., 2011). The results of this EM are positive and therefore it is relevant to analyze the ergonomic consequences in full.

METHOD

Research questions

The basic research questions were:

1. What is the degree of implementation of EM in Dutch ICU's?
2. What is de definition of EM according to nurses?
3. What kind of barriers and opportunities do nurses see when it comes to implementation from a clinical perspective and from an occupational health perspective?
4. What protocols are in use for EM?
5. What kind of equipment is in use?

Research instruments

A so-called context-analyses was performed to assess the opportunities and barriers for EM in the present situation. Such an analysis has proven to be successful in the past as a strategy to prepare for the introduction of ergonomic improvements on a hospital- and on a national- basis in the Netherlands. The aim is to refine the implementation strategy, anticipate on the barriers that will be always encountered and to create commitment among the target

group.

The context-analysis was performed with the following research instruments:

1. A survey (based on Knibbe et al., 2006, 2008),
2. Two focus group meetings with a selection of 12 ICU's

The analysis was performed stepwise in two focus-group meetings with the additional use of a survey in a group of 12 ICU's along with a description of the state of science when it comes to the equipment that is required for EM and the relation with the ergonomic and occupational health challenges on an ICU. The challenges, problems, barriers and opportunities were described in a systematic way. Comparisons are and will be made with the general monitoring data on the situation in Dutch hospitals (Knibbe & Geuze, 2006 onwards) and ICU's, the (inter) national guidelines and the ISO/TR 12296 (2012) on the handling of patients (Hignett et al., 2014).

RESULTS AND CONCLUSIONS

Currently the data have been gathered and are analyzed. From the literature it appears that early mobilization improves outcomes in the short and long run, but does require adequate equipment to enable the staff to implement these programs in a safe and ergonomically sound way (Vasilevskis et al 2010, Bassett et al 2012, Gosselink et al., 2011). Despite the mounting evidence of the benefits, early mobilization of ICU patients appears still not to have been widely applied. By structuring the responses from the survey and feeding them back to the participants from the 12 ICU's we have found three areas of concern when it comes to the ergonomic aspects of EM.

1. Terminology issues: no consensus

There is a difference in opinion on the definition of EM and there is no consensus. EM can mean anything between activating a patient by simply talking to him to actually bringing them to a standing and walking position for prolonged periods. Our study so far shows that in Dutch hospitals most IC-nurses (92%) state that early mobilization programs are in place. However when asked to specify what is meant by EM in their own hospital, it is evident that implementation is still limited. Specification of these programs shows that in the majority of hospitals this is still a general notion. Full implementation is hardly ever achieved with a few exceptions of early innovators in this field. Like stated in the international literature mentioned above: there is a lot of room for improvement. This brings us to our second source of concern for future implementation.

2. Equipment issues

One of the major problems is the lack of equipment that will enable early mobilization without compromising the nurses' and physical therapist health. When it comes to this equipment there is a lack of information of what is available. The type of equipment is often not adequate (f.e. transfers are not solved and/or working posture is not in line with common ergonomic-standards) and/or nursing staff is not trained to make use of all the options and/or the nurses are not confident enough that there will be no adverse clinical consequences of early mobilization for the patient.

To enable early mobilization specialized equipment and special ICU beds are necessary to avoid physical overload and occupational hazards for nurses and therapists. Some, but not all of the equipment in place appears to be beneficial for the specialized personnel on the ICU from an ergonomic perspective. This needs to be installed in order for an EM policy to be successful. Both nurses and physical- and occupational therapist will then be able to provide safe assistance without compromising their own health. It is obvious that this field is moving forward fast in the clinical area, but also that there is a growing need in this field of clinical practice for ergonomics and protection of the occupational health of nurses to keep up with this speed.

3. Guideline issues

Finally it was also clear that although there are well-developed protocols available in the literature they are often not in use yet and do need to be tailored to each specific ICU situation. It is obvious that EM requires a culture change, a change in the use of adequate ergonomic equipment that will not only enable safe EM for the patient, but also for the nurse and careful step-by-step implementation is required of the complex, interrelated processes on a ICU, EM-

protocols and equipment.
NB The deadline for data collection of the study was spring 2014: we will be able to present full results in July 2014.

REFERENCES

Bassett, R., Vollman, K., Brandwene, L., Murray, T. (2012). *Integrating a multidisciplinary mobility programme into intensive care practice (IMMPTP): A multicentre collaborative*. Intensive and Critical Care Nursing; 28: 88-97.

Dueck, M., Wind, A., Trieschmann, Schink, U. (2010). *Respiratory effects and safety of an intermittent standing position during mechanical ventilation*, Cologne, Poster ESICM.

Gosselink, R., Clerckx, B., Robbeets, C., Vanhullebusch, T., Vanpee, G., Segers, J., (2011). *Physiotherapy in the Intensive Care Unit*, Neth. J Crit Care, 15, 2. pp. 66-75.

Hignett, S., Fray, M., Battevi, N., Occhipinti, E., Menoni, O., Tamminen-Peter, L., Waaijer, E., Knibbe, H.J.J., Jäger, M. (2014). *"International consensus on manual handling of people in the healthcare sector: Technical report ISO/TR 12296"*; 44(1): pp. 191–195.

ISO/TR 12296 (2012), Geneva.

Jansen, J., Morgenstern H., Burdorf, A. (2004). *"Dose response relations between occupational exposures to physical and psychosocial factors and the risk of low back pain"*. Occupational Environmental Medicine, 61(12): pp. 972–979.

Jol., M., (2007). *Projectverslag Inspectierapport Academische en Algemene Ziekenhuizen*, A771, Ministerie van SZW, 2007.

Knibbe, J., Geuze, L., Nulmeting Arboconvenant Ziekenhuizen, fysieke belasting, 2006-2010, LOCOmotion, Research voor Beleid. Leiden.

Koppelaar, E., Knibbe J.J., Miedema H.S., Burdorf, A. (2011). *"Individual and organisational determinants of use of ergonomic devices in healthcare"*, Occup Environ Med. 68(9): pp. 659–665.

Ovayolu, O., Ovayolu, N., Genc, M., Col-Araz, N., (2014). *Frequency and severity of low back pain in nurses working in intensive care units and influential factors,* Pak J Med SCi, 30(1): pp 70-76.

Schömig, E, 2008, *Exzellent sein, exzellenz schaffe*n, Uniklinik Cologne, Germany.

Sun, J., He, Z., Wang, S., Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi. 2007 Aug;25(8):453-5. Abstract: Prevalence and risk factors of occupational low back pain in ICU nurses].

Vasilevskis, E., Ely, W., Speroff, T. et al., (2010).*Reducing iatrogenic risks. ICU acquired delirium and weakness – crossing the quality chasm*. CHEST; 138(5): 1224-1233.