The evaluation of patient handling interventions in healthcare

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ABSTRACT: Patient handling intervention strategies are many and varied. The focus of interventions has primarily been on the health, safety and welfare of care givers. Since 2005 the European Panel of Patient Handling Ergonomics (EPPHE) has been supporting an international research project to develop a tool for the evaluation of patient handling interventions across the EU. 4 European countries were involved in its development. This tool has been used in a number of countries in different healthcare environments. The tool calculates management performance in 12 different outcome areas to evaluate the changes made following a patient handling intervention. It evaluates all types of interventions from management style to equipment supply or training and education interventions. This paper presents a review of the development and evaluation of this tool and suggestions for future validation.

1 INTRODUCTION

Patient handling is a known cause of musculoskeletal risk for healthcare staff. A range of ergonomic and other approaches have been used to reduce the effects of these tasks. Recent systematic reviews have concentrated on the specific measures of musculoskeletal disorders (MSD) in healthcare staff using high level scientific data (e.g. Amick *et al*., 2006) and deduce there is little high quality evidence available and little proven benefit on MSDs. Hignett et al (2003) used an inclusive methodology to allow more outcomes to be considered.

The literature reports different methods for measuring outcomes from patient handling interventions. It is difficult to conduct a meaningful comparison between different interventions or different methods of measuring outcomes. This paper describes the development of an 'inclusive' evaluation tool which quantifies patient handling interventions and guides organisations to a more directed and streamlined approach for future intervention investment.

Experts and practitioners from four European Union (EU) countries participated to add to the content validity and strengthen the evaluation tool. This project was assisted by Arjo-Huntleigh ab and the European Panel of Patient Handling Ergonomics (EPPHE).

The aim of this paper is to review the development of the Intervention Evaluation Tool (IET) which allows the comparison of different types of interventions on a single score system using a range of outcomes. In particular concentrating on the improvements and changes made through iterative evaluation. Finally suggestions are made for future studies to improve validation.

2. METHODS

2.1 *Development of the Intervention Evaluation Tool (IET)*

a. *Selecting preferred outcomes*
The most important outcomes that were to be included in the study were identified using focus groups across 4 EU countries. The 4 countries (UK, Finland, Italy, Portugal) were selected to give, geographical and demographic spread, suitable facilitation systems were present and a mix of levels in the implementation of the EC directive on manual handling in healthcare (Hignett et al., 2007).

The structure for the focus group was based on the 'Nominal Group Technique' (Higgins 1994). The method was tested at 2 UK and 2 international pilot sessions. Recruitment for the focus group facilitators took place through the EPPHE group network. Several key stages were used to improve the between-groups validity (Fray 2010) including: guidance for recruitment, organization and recording of the groups, all documents translated, group discussions in natural language, whispering interpreter present during all groups, transcriptions independently translated.

The Principal Investigator (MF) was present at all the EU groups to assist with standardisation and the development of the discussion group check list in collaboration with the EU facilitator and interpreter. The relative importance of the outcomes was considered within each of the individual and homogenous groups. Content and thematic analysis using qualitative software (NVivo) recorded the range of outcomes and a ranked scoring system created the relative importance.

b. *Selecting measurement methods*
To select the methods for measuring each of the preferred outcomes a detailed analysis of published patient handling studies was completed. Studies were collected using the search strategy used for Hignett et al. (2003) up to December 2008 (n = 328 papers). Each paper was analysed by two independent researchers and the following data were recorded:

- Design of the study
- Characteristics of the intervention
- Quality Rating (QR; Downs and Black, 1998)
- Level of outcome measure (Robson, 2007)
- Practitioner rating (from Hignett et al, 2003)

The measurement tools for each included outcome were assessed using the following:

- Level of academic quality of the study (QR rating >50%).
- Evidence of peer reviewed validation studies for the method.
- Previously used to score a peer reviewed intervention trial.
- Most frequently used measurement devices.
- Complexity of the data collection in healthcare.

The measures that gave the best result over all these criteria were selected.

3 RESULTS

Four EU focus groups and 2 worldwide expert panels were completed (n = 44, 9 countries).These results were analysed for content and theme. 210 outcomes were recorded which the most highly valued outcomes.

The thematic definitions were ranked and themes that scored less than 5 in any country were removed. The same 12 outcomes were seen as most important in all countries.

Table 1. Ranked themes for individual and combined EU countries.

1. Safety Culture (Organisational)
2. MS health measure (Staff)
3. Competence and compliance (Staff)
4. Absence or staff health (Organisational)
5. Quality of care (Patient)
6. Accident numbers (Organisational)
7. Psychological well-being (Staff)
8. Patient condition (Patient)
9. Patient perception (Patient)
10. MSD exposure measure (Staff)
11. Patient injuries (Patient)
12. Financial (Organisational)

Statistical Analysis Kendall's Measure of Concordance was significant using the correction factor for tied ranks $P < 0.005$, $W = 27.66$ ($N = 12$, df 11, $k = 4$) indicating close agreement between the groups.

The literature analysis examined all the methods used to measure outcomes in the included studies. All papers with a QR of >50% were reviewed. Table 2 shows the most suitable method for measuring each the 12 preferred outcomes. Some of the methods chosen were closely related to known peer reviewed tools and studies (1, 2, 3, 4, 7, 9). But others required careful consideration of a range of tools (5, 6, 10, 12). The patient outcomes were poorly represented in the literature and needed new methods of measurement to be devised.

Table 2 The measure and sources of the IET.

1. Safety Culture—Organisational audit of safety systems (PHOQS Hignett 2005)
2. MS health measure—MSD level in staff (Nordic Questionnaire Dickinson 1992)
3. Competence and compliance—Observational checklist (DiNO, Johnsson 2004)
4. Absence or staff health—Standard absence per work pop (OSHA Charney 1997)
5. Quality of care—Ward and patient survey to evaluate care quality (Nelson 2008)
6. Accident numbers—Accident numbers and non-reporting ratios (Menckel 1997)
7. Psychological well-being—Worker satisfaction and well being (Evanoff 1999)
8. Patient condition—Patient survey to evaluate clinical needs (Nelson 2008)
9. Patient perception—Survey for comfort, security, fear etc (Kjellberg 2004)
10. MSD exposure measure—Workload from patient handling tasks (Knibbe 1999)
11. Patient injuries—Measure for detrimental effects of poor handling (No source)
12. Financial—Calculation of costs versus investment (Chokar 2005)

4 EVALUATION OF THE IET

The process of measuring and comparing different types of patient handling interventions has been addressed with the development of the Intervention Evaluation Tool. Every effort has been made to draw the content from studies and measurement methods that have either a good academic score or have proven validation. Some outcome areas were poorly represented in patient handling studies,

in particular those relating to patient conditions and quality of care. The IET had comprehensive peer review evaluations during its development:

1. UK pilot in acute hospital, redefine model and guidance.
2. Expert panel of stakeholders in UK.
3. Use of IET in acute hospital (UK).
4. User focus group and feedback (UK).
5. EU translation and back translation.
6. Use IET in acute hospitals (4EU).
7. User feedback groups (4EU).
8. EU expert focus group evaluation panel (EPPHE).

This complex evaluation and peer-review process has lead improvements in the design, structure, documentation and scoring of the IET method:

- Refined data collection tools (1/2 day completion)
- Positive and negative default scores for missing data
- Suitable score ranges for good and bad performance
- Procedural information for training programme
- Spreadsheet data entry and score system

In addition to the data collected during development, further studies have begun to elaborate on the usability and validity of the IET.

1. 9 wards in a UK community rehabilitation hospital (Merritt, 2011)
2. 8 Wards in Portuguese hospital (Cotrim et al., 2011)
3. 2 wards with repeated measures in Acute hospital

Further evaluation is required to validate this tool. The collection of larger data sets could allow evaluations of:

• The validity of patient based outcomes created for this method.
• Questions of inter-rater reliability between users.
• Ensure that the scores accurately record the reduction in patient handling risk.

If this tool proves to be a usable, efficient and valid measurement tool then it will be possible to identify the strengths and weaknesses in an organisation from the scores in the 12 sections and the full IET score for patient handling interventions. This will allow future interventions to be designed with specific outcomes and gains for the participating organisation, giving the opportunity for more directed interventions to enable best return on financial investment.

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