Translating pressure ulcer guidelines into practice: it's harder than it sounds
Xakellis G C, Frantz R A, Lewis A, Harvey P

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
The study examined a protocol aimed at reducing the incidence and time to healing of pressure ulcers in patients in a long-term care facility. The protocol consisted of identifying patients at risk of a pressure ulcer, the regular repositioning of patients with limited mobility, and providing support surfaces such as mattress overlays, chair cushions and padding for a bony prominence.

Type of intervention
Primary prevention and treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients requiring long-term care in an institutional setting.

Setting
The setting was an institution. The economic study took place at the Naval Medical Center in San Diego, USA.

Dates to which data relate

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
The resource use data were taken from the same patient sample that provided the effectiveness data. The data were collected retrospectively in the pre protocol sample, and the costing was undertaken prospectively for the post protocol and follow-up groups.

Study sample
All patients who were resident in the long-term care facility, and who did not have a pressure ulcer at the start of each of the three study periods, were included in the patient sample. There were 69 patients in the pre protocol group, 63 in the post protocol group, and 71 in the follow-up group. Some patients were included in more than one study group because of their continued presence at the care facility. No sample size or power calculations were reported in the paper.
Study design
This was a single-centred comparative study with historical controls. Each patient group was followed up for a period of 6 months, or until discharge from the care facility or death. The paper did not report whether any patients were lost to follow-up.

Analysis of effectiveness
It appears that all the patients entered into the study have been included in the analysis. The primary outcome measure was the time to pressure ulcer development. The study also assessed the number of incident pressure ulcers, the duration of pressure ulcer, and the outcome of pressure ulcer treatment. The three patient groups were shown to be similar in their demographic characteristics and risk factors for developing pressure ulcers. Consequently, no adjustments for potentially confounding factors were made.

Effectiveness results
The time to pressure ulcer development was statistically higher in the post protocol group (175 days) compared with the pre protocol group (156 days), (p<0.01).

There was no statistically significant difference in the time to pressure ulcer development between the follow-up group (164 days) and the pre protocol group (156 days), (p=0.16).

A total of 23.2% of the patients in the pre protocol group developed pressure ulcers, compared with 4.8% in the post protocol group and 14.1% in the follow-up group (no statistical test was reported).

Clinical conclusions
The authors concluded that the introduction of a protocol for the prevention and treatment of pressure ulcers was effective at reducing the number of incident pressure ulcers and at improving treatment outcomes. However, these improvements were not sustained 2 years after the implementation of the protocol.

Measure of benefits used in the economic analysis
The mean time to ulcer development was taken as the measure of health benefit.

Direct costs
The direct costs of the health care provider were included in this analysis. The resource use and cost data were taken from actual data collected from the study or a similar setting. The authors made some estimates where exact data collection was not feasible. The number of risk assessments and times patients were repositioned was taken from their clinical notes. The time taken to perform these tasks was taken from a study conducted at several similar facilities. These figures were multiplied by the average hourly salary and benefits for the appropriate personnel from the study setting. The cost of treating pressure ulcers was also calculated. The source of the estimate of time taken to attend to pressure ulcers was not reported. This estimate was multiplied by the average hourly rate plus benefits for a registered nurse. The cost of topical agents and dressings was taken as the wholesale price paid by the facility. Aids such as mattress overlays were costed at the wholesale price paid by the facility.

The indirect costs of nursing were also included in the cost calculations. It was estimated that an additional 30% of time for each activity was taken up in documenting procedures and communicating with staff and patients. This time was costed at the hourly rate plus benefits. The time taken to provide nursing and other personnel management and training was estimated to be an additional 9.2% of time spent on direct nursing activities. This was costed at the hourly rate plus benefits of a registered nurse. The price year was 1994 for the pre protocol group, 1995 in the post protocol group, and 1997 for the follow-up group. The costs were not discounted, which was appropriate as each study period was 6 months.
Statistical analysis of costs
The cost data were treated deterministically.

Indirect Costs
No indirect costs were included in the study.

Currency
US dollars ($).

Sensitivity analysis
Two one-way sensitivity analyses were performed to assess variability in the data. One varied the cost of the preventative measures included in the protocol, while the other altered the costs of labour and supplies. In each case the costs were increased and decreased by 20%. No rationale for this variation was given.

Estimated benefits used in the economic analysis
When the post protocol group was compared with the pre protocol group, a mean increase of 12 ulcer-free days was obtained. If the follow-up group was compared with the pre protocol group, there was a mean increase of 8 ulcer-free days.

Cost results
The total cost per patient was $150 in the pre protocol group, $141 in the post protocol group, and $178 in the follow-up group.

Synthesis of costs and benefits
When the post protocol group was compared with the pre protocol group, there was a saving of $0.75 per ulcer-free day. When the follow-up group was compared with the pre protocol group, each additional ulcer-free day cost $3.50.

Authors' conclusions
The introduction of the pressure ulcer prevention protocol was clinically effective and cost-effective in its initial period. However, the initial improvements were not sustained.

CRD COMMENTARY - Selection of comparators
The authors selected the practice in place before the new protocol was introduced. You should consider how this relates to usual practice in your setting.

Validity of estimate of measure of effectiveness
The authors obtained their clinical effectiveness evidence from a comparative study with historical controls. They acknowledged that the lack of randomisation, and the fact that the patients could be included in more than one group, limits the robustness of their findings. The authors did not compare their patient groups with the wider patient population in long-term care facilities. The three patient groups were shown to be comparable in terms of demographic characteristics and risk factors for pressure ulcers. An appropriate statistical analysis, taking account of all patients, was undertaken.

Validity of estimate of measure of benefit
The estimate of benefit used in the economic analysis was taken directly from the clinical effectiveness data. No
justification for the use of time to pressure ulcer development was given.

**Validity of estimate of costs**
The study adopted the perspective of the health care provider and, as such, all appropriate costs appear to have been included. The unit costs and the resource quantities were reported separately, which will assist any attempts to apply these findings to other settings. The price year for each patient group was reported, which will allow future reflation exercises. However, the analysis compared the costs incurred over a 4-year period without any reflation to a single year. This limits the application of the study findings. No statistical analysis of the resource use and cost data was undertaken, therefore the degree of uncertainty around this data was not assessed. The sensitivity analysis examined the impact of varying the costs of labour, supplies and preventive methods.

**Other issues**
The authors compared their findings with other appropriate studies in the same field. They presented their results in a comprehensive manner. Their conclusions reflected the data presented in the paper. However, the fact that the cost data spanned a 4-year period means that their conclusion is not necessarily accurate. The authors acknowledged a number of limitations to the methodology of their study. First, the potential for an individual to be included in more than one patient group. Second, problems with using a historical control group, such as the lack of randomisation. Finally, the fact that the resource use data were taken from clinical notes rather than actual observations.

**Implications of the study**
The authors did not make any explicit recommendations for changes in practice or further research. However, they did warn that changes in practice need organisational and cultural support if they are to be sustained over a longer period of time.

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