Improving pressure ulcer management in Australian nursing homes: results of the PRIME trial organisational study

Ellis I, Santamaria N, Carville K, Prentice J, Ellis T, Lewin G & Newall N

Summary

Pressure ulcer prevalence is frequently cited as a factor used to determine the quality of nursing care and is used as a proxy measure for nursing home quality. This paper reports the results of the organisational study conducted as a subcomponent of the PRIME trial. The PRIME trial was a multi-dimensional clinical trial designed to investigate the effectiveness of an integrated pressure ulcer management system in reducing the pressure ulcer prevalence and incidence in a cohort of Australian nursing homes. A stratified random sample of staff were interviewed from 17 consenting nursing homes (n=120). The interviews used a 10 question, semi-structured questionnaire covering four organisational quality factors and six PRIME trial implementation factors. Responses to questions were ranked on a scale of 1-5, 1 representing no evidence and 5 representing embedded practice. Data were aggregated by nursing home and the mean scores were calculated. Data were correlated with baseline pressure ulcer prevalence and the post PRIME pressure ulcer prevalence.

The results of this study show that there was no relationship between baseline pressure ulcer prevalence and the context of care as measured by a range of organisational factors, including staff development planning, equipment and resource management, communication management and effectiveness of staff and resident feedback. The PRIME trial was able to significantly reduce prevalence of pressure ulcers regardless of the context of care. Paired sample t-tests showed a significant difference between the mean baseline prevalence (25.8%) and the mean post PRIME pressure ulcer prevalence (16.6%) (p=0.008) in nursing homes participating in the organisational component of the PRIME trial.

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Introduction

Pressure ulcers are widely thought to be useful indicators of nursing home quality [1-3]. The incidence of pressure ulcers is also thought to be a valid indication of nursing care quality [4]. However, some authors argue that adverse events data such as the occurrence of a pressure ulcer reflect patient acuity rather than care quality [5]. Santamaria *et al.* [6] found that, in high care nursing home residents, there was a significant association between the development of a pressure ulcer and comorbidity as measured by the Charlson Comorbidity Index, risk assessment as measured by the Braden Scale and the lack of appropriate pressure relieving equipment.

Many authors place responsibility for the outcomes of pressure ulcer management on nurse managers [7, 8]. However, the Netherlands national benchmarking study found that, in units where enrolled nurses were targeted for education, there was a reduction in pressure ulcer prevalence. They did caution that these units had high baseline prevalence and the changes may in fact be standardising to the mean [9]. However, despite many unit managers recognising a need to change practice and signalling an intention to do so, the Netherlands reported no overall change in prevalence between the 1998 and the 1999 national prevalence surveys of 42,817 acute care patients [9].

There have been questions about the accuracy of documentation of pressure ulcer management in nursing homes in the United States. Bates-Jensen *et al.'s* study [10] verified the care documented using observation methods and wireless thigh movement sensors. They found that there was no difference in the actual care provided between nursing homes where the pressure ulcer quality indicator was high compared to nursing homes where it was low. The difference was in the quality of the documentation, being better in the nursing homes with the highest prevalence of pressure ulcers. These nursing homes were also more likely to use appropriate pressure relieving equipment. There is therefore conjecture about whether pressure ulcer prevalence is an appropriate measure of the quality of care provided to nursing home residents, or whether it is appropriate to use pressure ulcer prevalence as an indicator of nursing home quality.

Therefore the objective of this study, which is part of a larger study known as the PRIME trial, was, first, to investigate the relationship between the pressure ulcer prevalence in a cohort of 1956 consenting nursing home residents with measures of organisational structures and processes and, second, to investigate the effectiveness of the PRIME trial facilitation model in introducing and embedding evidence-based pressure ulcer management in the 23 participating nursing homes.

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The PRIME trial was designed to investigate the effectiveness of an integrated pressure ulcer prediction, prevention and management system. The PRIME system includes a substantial education programme, dissemination of the Australian Wound Management Association's *Clinical guidelines for the prediction and prevention of pressure ulcers*, the Alfred/Medseed Wound Imaging System, an electronic incidence database and the use of the PURA and PURAMS instruments [6].

Methods

Following institutional ethics approval, a stratified random sample of staff (n=120) were interviewed from 17 of the 23 nursing homes participating in the PRIME trial (Table 1). All interviews were conducted by phone and ranged between 10-40 minutes. The interviews consisted of a 10 question, semi-structured questionnaire covering six PRIME trial implementation domains and four organisational quality domains. Responses to questions were ranked against cues on a scale of 1-5, 1 representing no evidence and 5 representing embedded practice. Data were aggregated by nursing home and by staff category; means were correlated. Paired samples T-tests were applied to baseline pressure ulcer prevalences and the post PRIME pressure ulcer prevalences.

PRIME score

The PRIME score was calculated as the sum of questions one to six. It measured the effectiveness of the facilitation model. A high score indicated that respondents were aware of the new pressure ulcer risk assessment and documentation procedures and had received training in the new system. If respondents were aware of the nursing home implementation plan and evaluation framework, they received a higher score.

Table 1. Organisational study participants by staff category.

Staff category	n	%
Care assistant	33	27.5
Admin/IT	7	5.7
Registered nurse	33	27.5
Enrolled nurse	25	20.9
Nurse manager	11	9.2
Director of nursing	11	9.2
Total	**120**	**100.0**

Organisational score

The organisational score was calculated as the sum of questions 7-10. A high score indicated respondents had a clear understanding of the policies and procedures of their nursing home, management planning was linked to staff performance review and there was a clear understanding of the organisational structure. The equipment procurement plan was based on data gathering and analysis; there were also effective communication procedures, including a procedure for staff and resident feedback. The statistical package SPSS V12 was used to analyse the data.

Results

We used baseline pressure ulcer prevalence to establish if there was an inherent relationship between the organisational score and the prevalence of pressure ulcers in the nursing homes participating in the study. We found that there was no relationship between baseline pressure ulcer prevalence and a range of organisational factors which constitute the context of care, including staff development planning, equipment and resource management, communication management and effectiveness of staff and resident feedback.

We posed the question, what is the relationship between the organisational context of each nursing home and their PRIME trial implementation? We found a significant correlation between the mean organisational score and the mean PRIME score (p=0.00), confirming that there is a relationship between the context of the organisation and their ability to implement the PRIME trial. Exploring a range of variables, we found that nursing homes with an education and staff training plan that linked to performance management were more easily able to implement the PRIME trial (p=0.000). We also found a significant correlation between the scores of enrolled nurses and care assistants in the communication domain and the facility's ability to embed new practice (Tables 2 & 3).

The PRIME trial was able to significantly reduce the prevalence of pressure ulcers, regardless of the context of care. Paired sample t-tests showed a significant difference between the mean baseline prevalence (25.8%) and the mean post PRIME pressure ulcer prevalence (16.6%) (p=0.008) in the nursing homes that participated in the organisational component of the PRIME trial (Table 4).

Table 2. PRIME trial implementation scores.

PRIME implementation domains	Mean PRIME score for all facilities range (1-5)	Min range (1-5)	Max range (1-5)
Q1. Protocols PURAMS AMWIS	2.9	1.4	4.3
Q2. PRIME team identified	3.0	2.0	4.7
Q3. Evaluation understood	2.0	1.3	3.4
Q4. Implementation timeline	2.0	1.0	3.9
Q5. Internal facilitation	2.5	1.4	4.0
Q6. Clinical champions and management support identified	2.0	1.1	3.3
Mean PRIME score	**14.4**	**8.2**	**23.6**

Table 3. Organisational domain scores.

Organisational domains	Mean organisational score for all facilities range (1-5)	Min range (1-5)	Max range (1-5)
Q 7. Facility education plan	2	1	3.4
Q8. Equipment and resource plan	3	1.7	3.6
Q9. Organisational communication strategies	3.5	2.7	4.3
Q10. Resident and staff feedback mechanisms	3.4	2.1	4.4
Mean organisational score	**12**	**7.5**	**15.7**

Discussion

The organisation in which health care is provided is generally considered to be important to the quality of care outcomes achieved. Therefore, we wanted to understand how the organisational culture and context impact on clinical outcomes and on implementing a new clinical care system, in this case the introduction of the PRIME trial.

Our data show nursing homes have a variety of cultures, characterised by heterogeneity of hierarchical leadership structures. This we categorised in three ways (depending on the self-reported care role of the director of nursing and the nurse unit manager) – hierarchical management, hands on management and clinical leadership. Despite all being high care nursing homes, the skill mix of staff caring for residents varied. All homes employed registered nurses, some homes employed enrolled nurses and care assistants, while others only employed enrolled nurses. Few nursing homes in the trial had resident IT support staff; however, all had a receptionist/administration officer.

Our method of selecting a stratified random sample from each nursing home, including staff who only worked night shift or weekends, allowed us to understand the context in which care was provided from the perspective of those providing care around the clock and those managing care in each facility. There did not appear to be any correlation to the type of organisational structure or the culture of the various nursing homes and the baseline pressure ulcer prevalence. In fact, one nursing home which scored in the middle of the range on the organisational domains had a 0% prevalence, whereas a nursing home that scored relatively high had a 30% prevalence. This confirms the findings of Holtzman *et al.* [11], who report that good structures do not necessarily result in good outcomes and that the structure of a facility does not necessarily reflect the care that an individual receives.

Pressure ulcer care in high risk patients relies on constant vigilance by carers, regardless of their qualifications or the time of day they work. Appropriate wound care requires the correct procedure to be performed at the correct time, in the correct manner [12]. Until recently, accurate information to guide pressure ulcer management has been relatively difficult to find [13]. The Australian Wound Management Association released *Clinical practice guidelines for the prediction and prevention of pressure ulcers* in 2001. However, Stacey [7] argues that even these guidelines are based on relatively low level evidence. He proposes that "the answer in reducing pressure ulcer prevalence lies not in implementing one strategy, but in providing an institution wide prevention programme".

Table 4. Combined PRIME and organisational scores (Embed score) and pressure ulcer prevalence by nursing home.

Facility	Mean Embed score (range 10-50)	Baseline pressure ulcer prevalence %	Post PRIME introduction pressure ulcer prevalence %
W10	36.8	30	8.6
W11	36.4	33	16.7
N2	31.3	25	18.0
W7	30.1	26	11.3
N5	29.3	22	20.0
N1	28.5	22	18.4
N4	26.6	26	15.2
N7	24.9	37	15.0
W1	24.9	0	15.0
N3	24.7	28	15.2
W12	23.3	13	19.0
W6	22.8	13	10.2
W8	22.8	37	13.5
V1	22.7	53	16.7
V2	22.6	30	23.7
W2	19.7	29	25.0
W14	17.7	14	18.8
Mean		**25.8**	**16.6**

The change management facilitation model designed as part of the PRIME system used both internal and external facilitation strategies; it implemented standard risk assessment tools, standardised educational material, and worked with nursing homes to recognise their equipment and training needs. The PRIME score measured participants' knowledge of both the internal and external facilitation team and the methods used.

Good facilitation that is transformative in nature and uses credible experts and internal opinion leaders has been shown to be effective in implementing evidence-based practice [14]. It has also been shown to be able to overcome poor contexts [15, 16]. The mean pressure ulcer prevalence after the PRIME implementation reduced significantly from 25.8% to 16.6% (p=0.008), indicating that the PRIME model was effective at introducing evidence-based pressure ulcer management; as a consequence, pressure ulcer prevalence was reduced.

Conclusion

A one-off pressure ulcer prevalence score is not a reliable indicator of quality care provided or the quality of nursing home organisational processes. Our findings highlight the need for nursing homes to accurately document the actual care they provide. They also need to monitor the incidence of pressure ulcers on a day to day basis and pressure ulcer prevalence on a regular basis.

Nursing homes also need to be encouraged to benchmark with like organisations for the purpose of monitoring compliance with evidence-based pressure ulcer guidelines. By doing this, they can identify residents who are at risk of developing a pressure ulcer on admission and those who are in need of ongoing care. Residents with higher acuity levels and comorbidities are more likely to develop pressure ulcers than those with lower acuity and less comorbidity. Adequate and ongoing risk assessment is required for all residents to minimise the risk of pressure ulcer development and to institute the appropriate management strategies. Appropriate use of pressure relieving equipment linked to sound risk assessment procedures reduces the prevalence of pressure ulcers. Ensuring those providing care, including enrolled nurses and care assistants, are well informed of pressure ulcer management strategies being implemented in their nursing home will help to reduce the pressure ulcer prevalence.

Finally, in a well managed unit, one that has organisational support for best practice, it is easier to implement and embed new initiatives that lead to improved outcomes for nursing home residents, namely, the appropriate prediction and prevention of pressure ulcers.

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