Skin safe. Implementing clinical guidelines to prevent pressure ulcers in home care clients

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Summary

Silver Chain, the largest community care provider in Western Australia, assists older people and individuals living with a disability to remain living independently in the community. Many of these individuals are at risk of developing a pressure ulcer. This paper describes the results of a project that combined the introduction of the Australian Wound Management Association's (AWMA) *Clinical Guidelines for the Prediction and Prevention of Pressure Ulcers* [1] into everyday work practices across the organisation with a systematic evaluation of the strategy's effectiveness.

The project was originally designed to have the four discrete stages of: 1) baseline data collection, 2) guideline implementation, 3) repeat of baseline data collection, 4) ongoing evaluation. The main outcome measures were pressure ulcer prevalence and the adoption of prevention practices recommended by the guidelines. However, the lack of a significant reduction in prevalence when the baseline measures were repeated at one year, prompted the modification of the original design to include two further stages. These involved the implementation of strategies to reinforce the adoption of practice changes, followed by a third prevalence survey.

The project was then found to have been successful in significantly reducing the prevalence of pressure ulcers among our most at risk clients as well as having achieved practice change among our home care staff. However, ongoing monitoring indicates that the practice changes are not being sustained over time and that further research is needed to determine how the adoption of new practices may be better maintained so that a return to baseline levels of pressure ulcer prevalence may be avoided.

Introduction

Pressure ulcers have been identified as a worldwide problem that contributes significantly to health care costs as well as to the ill-being and even death of the individuals afflicted [2-6]. They are common among patients who are disabled and immobile and they are also predictable and preventable [7,8]. The evidence related to their prediction and prevention was used as the basis for the development of the Australian Wound Management Association's (AWMA) *Clinical Guidelines for the Prediction and Prevention of Pressure Ulcers* [1]. The introduction of these guidelines has been shown to be effective in significantly reducing the prevalence of pressure ulcers in both acute hospital and nursing home settings [9,10].

Silver Chain is the largest provider of community care in Western Australia, assisting approximately 37,000 West Australians each year. Silver Chain cares mainly for older people and individuals with a disability who need assistance with everyday activities of daily living. A significant number of these individuals have severely compromised mobility and are at risk of developing pressure ulcers. When AWMA published its guidelines in 2001, Silver Chain did not have protocols to identify and manage pressure ulcer risk. Therefore, a project was designed to combine the introduction of the AWMA guidelines into everyday work practices across the Silver Chain organisation with a systematic evaluation of the strategy's effectiveness. The baseline data for the evaluation (described in an earlier article), showed 42% of those considered most at risk to have a pressure ulcer and confirmed the need for the project [11]. This article describes the subsequent project stages and the results of the evaluation.

Methods

Study design

This project was designed as an intervention study with four discrete stages:

1. Collection of baseline data.
2. Implementation of AWMA guidelines.
3. Repeat collection of baseline data.
4. Ongoing evaluation.

However, owing to the lack of significant change in pressure ulcer prevalence found in Stage 3, the study was extended to include two further stages as indicated below:

1. Collection of baseline data.
2. Implementation of AWMA guidelines.
3. Repeat collection of baseline data - 1.
4. Implementation of strategies to improve compliance with AWMA guidelines.
5. Repeat collection of baseline data – 2.
6. Ongoing evaluation.

In addition, although the original study design included two measures of effectiveness (pressure ulcer prevalence, and change in staff knowledge and work practice as measured by a questionnaire), it was decided to drop the second measure because of the very low return rate of the staff questionnaire at the first repeat data collection and its resultant dubious ability to provide a representative picture. Therefore, the methods and results pertaining only to pressure ulcer prevalence are presented here.

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Collection of baseline data

Data collection tool

The development of the pressure ulcer survey tool was based on Prentice's earlier work [11] and has been outlined in a previous publication [12]. This instrument collected information about the individual, pressure ulcer risk factors, documentation and equipment in use as well as details of any pressure ulcers found when the person's skin was inspected.

Prevalence survey

The majority of individuals who receive home care services from Silver Chain are frail older individuals who are independently mobile and have low level domestic support needs. These individuals have a relatively low risk of pressure ulcer development. As a consequence, it was decided to evaluate the effectiveness of the intervention on individuals who because of mobility problems are at higher risk of pressure ulcer development. Cost considerations influenced the decision to evaluate the effectiveness of introducing the guidelines only within the Perth metropolitan area, even though the new work practices within which they were embedded, were also introduced into our rural and remote services.

Therefore, the individuals invited to participate in the pressure ulcer survey lived in the metropolitan area and on their latest assessment (home care clients are assessed at referral and then at least annually) had been found on the mobility sub-scale of the modified Barthel index [13] to be essentially immobile or wheelchair bound; 344 individuals met these criteria and of these 175 agreed to participate in the survey. The details of this recruitment process can be found in our first article.

Ten nurse surveyors (NS) were recruited externally, educated in the survey protocol and their competency in staging pressure ulcers established through testing. The clinical nurse specialists (CNS) working in the metropolitan area received the same education and testing. In order that a full skin inspection could be conducted including those anatomical areas that would otherwise have been covered by dressings and bandages, the CNSs surveyed clients receiving wound care at the time of the survey while the NSs visited all others. On the majority of occasions the survey was completed by just one surveyor, although in order to survey the most disabled individuals it was often necessary to arrange for another person to be present to assist with turning and transfers. Additionally, to ensure inter-rater reliability was maintained throughout the survey, on thirty randomly selected occasions the NS was accompanied by either a CNS or the clinical nurse

consultant (wound care) and they both surveyed the client independently. They then compared the information they had both collected and if there were any differences; consensus was achieved via discussion and reassessment. This final assessment was then used in the survey results. The survey was completed within ten days.

Implementation of the AWMA guidelines

There were three important stages within the implementation process:

1. The development of work practices and protocols for each staff group within each service to operationalise the guidelines and to collect data to monitor their adoption and to measure outcomes. This was achieved with the assistance of a small group of service representatives.
2. Documentation of these processes and work instructions to fit within Silver Chain's quality management system and the development of a training program and a resource manual to support their implementation.
3. Training sessions for all staff preceding the introduction of the new work processes and documentation.

In order to minimise the costs of introducing the work processes it was decided whenever possible to use established meeting times for training staff in the new work processes and documentation. It was also decided to stagger their introduction across the organisation, commencing with the metropolitan services, then rural and finally, remote services. In order to ensure that implementation was complete, systems were put in place for recording staff attendance at training sessions and regularly forwarding reports to managers. It was also necessary to set up systems for training new staff and updating existing staff on an ongoing basis. Implementation was complete across all metropolitan services six months following the baseline survey and six months before the scheduled post-intervention data collection.

Repeat collection of baseline data - 1

A second pressure ulcer prevalence survey was completed in December 2003, exactly one year after the first survey in 2002. It was considered important to avoid any possibility of the results being affected by seasonal variations in staffing or temperature (this being thought to have the potential to influence the results more for people living in the community than those in health or residential care facilities). It was also considered when the study was designed that this would allow sufficient time for practice changes to have impacted on the prevalence of pressure ulcers.

The conduct of the survey exactly mirrored that of the baseline survey, apart from a more streamlined client recruitment process. Ten NSs were again recruited externally and of these, five had been employed to conduct the baseline survey. Exactly the same inclusion criteria as at baseline were used to identify the clients to be recruited and 147 of the 292 invited to participate took part.

The survey instrument used was the same as at baseline, although whereas in 2002 we had needed to ask the surveyors to make a note in relation to whether each ulcer found was documented in the client's notes, in 2003 this question was included on the printed survey form.

Implementation of strategies to improve compliance with AWMA guidelines

As already described, because of the disappointing results of the follow-up prevalence survey (described in 'Results'), the design of the project was changed to include further work to reinforce the adoption of the new work practices around risk assessment and management. The project work group, which consisted of a management appointed representative from each of our services plus the project team, decided to implement a three-pronged strategy:

1. Identification of individual cases where the correct processes had not been followed, and construction of a series of case examples.
2. Feedback sessions for all staff throughout the metropolitan area to report on project progress and outcomes, and to discuss the case examples.
3. Service centre managers were provided with reports on the performance of their staff in the new work practices and requested to regularly reinforce their adoption.

These strategies were only possible because the original guideline implementation had included the integration of the new work processes into the organisation's client information management system. This allows the ongoing monitoring of the new work practices and the prevalence and incidence of pressure ulcers across the organisation, via the production of routine reports for service centre managers and their managers.

Repeat collection of baseline data – 2

The third prevalence survey was conducted in December 2004 and followed the same procedure as the previous two surveys. On this occasion 183 of the 371 clients approached agreed to participate. Once again the surveyors included externally recruited nurses and the Silver Chain CNSs.

All surveyors undertook the same education program and competency testing for pressure ulcer staging, regardless of how many times they had worked as a surveyor previously.

Data analysis

During each survey completed forms were collected centrally so they could be checked and any missing data chased up. When the survey was complete the forms were sent for data entry. The resulting data sets were then analysed using SPSS version 12.

Results

Survey samples

The numbers of clients that agreed to participate in the three prevalence surveys are shown in Table 1 together with the numbers of those who declined or were unable to take part. The reasons clients gave for declining to participate were very similar over the three surveys, namely that they were already receiving multiple visits and had other priorities in their already busy days.

Table 1. Recruitment outcomes *

Outcome	2002	2003	2004
Agreed to participate	175 (51%)	147 (50%)	183 (49%)
Did not wish to participate	109 (32%)	101 (35%)	129 (35%)
Discharged/On Hold	3 (1%)	20 (7%)	26 (7%)
Not contactable	57 (17%)	24 (8%)	33 (9%)
Total	344	292	371

* Percentages may add up to more than 100% because of rounding

Sample characteristics

The proportion of females to males differed slightly in each of the study samples; 49:51 (2002), 53:47 (2003) and 59:41 (2004). However, these differences were not found to be significantly different (χ^2 (1, N= 504) = 3.75, p =. 153). The age profiles of the samples are shown in Figure 1 and can be seen to be very similar. An analysis of variance confirmed that were no differences between the samples in terms of age (F (1, 503) = 0.439, p= .645).

Additionally, there were no significant differences between the clients in each of the survey samples in terms of their risk score (F (1, 503) = 2.263, p= .105). This risk score was assessed within the survey instrument and incorporates the score on the Braden scale plus a score related to availability of a carer. The profiles are shown in Figure 2.

Figure 1. Age profiles of survey samples

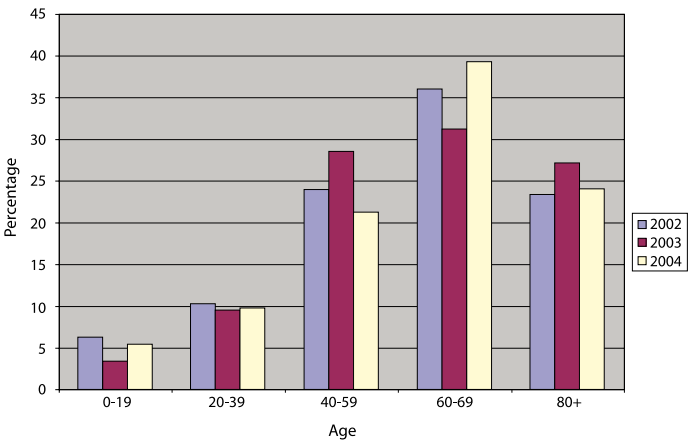
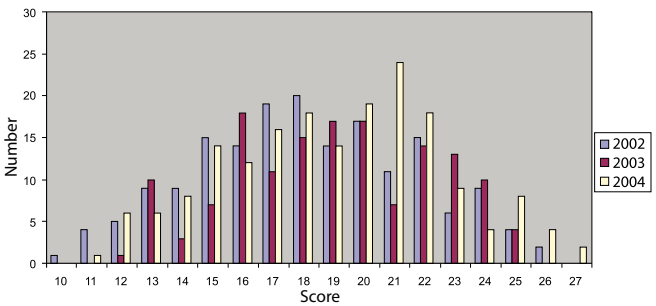


Figure 2. Risk profiles of survey samples.



Pressure ulcer prevalence

As shown in Table 2 the prevalence of pressure ulcers decreased from 42% in 2002 to 19% in 2004. The reduction of only 4% between 2003 and 2002 was not significant (χ^2 (χ^2(321)= .650, p=0.420), whereas the difference between 2004 and 2003 was (χ^2(330)= 15.653, p=0.000).

Numbers and stages of pressure ulcers

The majority of individuals surveyed only had one ulcer, although in the first survey one man was found to have eleven ulcers. Figure 3 shows that the number of clients with more than one ulcer was fewer each year. The proportion of

Table 2. Prevalence of pressure ulcers.

2002	2003	2004
42%	38%	19%

individuals with two or more ulcers decreased from 24.6% in 2002, to 17.7% in 2003 and 6.5% in 2004. Put another way, the average number of ulcers per client decreased from 0.97 in 2002 to 0.73 in 2003 and 0.27 in 2004. Again, the difference between the first and second surveys was non-significant ($F(1,320)=2.07$, p=0.151) whereas the difference between the second and third was highly significant ($F(1,328)=17.96$, p=0.000).

The majority of ulcers in all three years were stage 1, although it can be seen in Table 3 that in the last year the proportion was markedly smaller than in the previous years and the proportion of stage 2 ulcers was larger than previously.

Figure 3. Number of pressure ulcers per client.

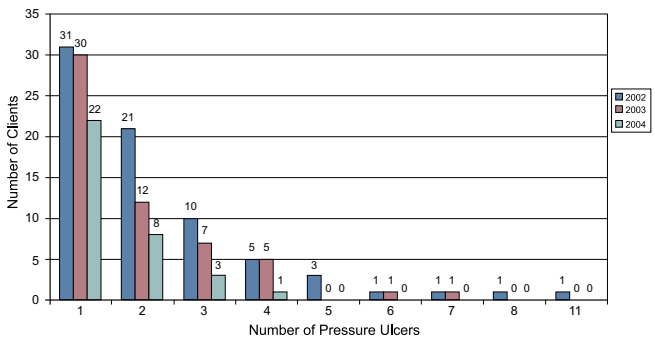


Table 3: Proportions of ulcers of each stage in each survey year.

Stage	2002	2003	2004
One	67% [112]	67% [72]	49% [25]
Two	27% [45]	30% [32]	45% [23]
Three	4% [6]	2% [2]	0% [0]
Four	2% [4]	0% [0]	6% [3]
Five (Eschar)	0% [0]	2% [2]	0% [0]

Aetiology and acquisition of pressure ulcers

The aetiology of the pressure ulcers identified was determined via a combination of observation of the wound, discussion with the client and carer, and examination of the client records. The surveyors were instructed to record the aetiology only if they were able to accurately establish the cause. They were asked to record 'unsure' in all other cases. Table 4 shows that pressure was found to be the most common aetiology in all three surveys.

Table 4. Primary aetiology of pressure ulcers identified.

Aetiology	2002	2003	2004
Pressure	71% [117]	58% [61]	64% [33]
Shear	7% [12]	10% [11]	10% [5]
Friction	15% [25]	12% [13]	14% [7]
Unsure	7% [12]	20% [21]	12% [6]

Surveyors were instructed to document all pressure ulcers as being acquired whilst receiving a service from Silver Chain unless there was documentation to the contrary in the client's record. Table 5 shows that the majority of pressure ulcers appear to have been acquired whilst the client was receiving a home care service from Silver Chain.

Table 5. Acquisition of pressure ulcers identified.

Where Acquired	2002	2003	2004
Silver Chain	82% [118]	85% [85]	88% [45]
Externally	18% [26]	15% [15]	12% [6

Evidence of change in work practices

Information was collected on three key elements of practice related to in the AWMA guidelines: whether and when a risk assessment had been conducted; whether the ulcer had been identified and documented; whether the correct pressure relieving or reducing equipment was being used.

Risk assessment

A significantly greater percentage (71%) of the clients who had a recent risk assessment in 2003 compared to 2002 (20%) ($\chi^2(322)=83.866$, p=0.000). This improvement was then maintained over the next year when 69% were found to have had a recent risk assessment.

Documentation

A similar pattern was found in relation to the number of ulcers that were documented in the client notes. There was a significant increase from 39% to 84% between 2002 and 2003 ($\chi^2(251)=42.323$, p=0.00), but some deterioration in 2004 (71%), which was not significant.

Equipment in use

Significant increases in the use of appropriate equipment were found between both 2002 and 2003 ($\chi^2(311)=4.707$, p=0.03), and 2003 and 2004 ($\chi^2(330)=18.322$, p=0.00). The percentages are shown in Table 6.

Table 6. Percentages of clients with appropriate equipment in use.

2002	2003	2004
63.4%	74.8%	90.7%

Discussion

As described in relation to the study design, there was only a small decrease in the prevalence of pressure ulcers six months after the implementation of the AWMA guidelines had been completed, and the difference was not statistically significant. However, there was clear evidence of practice change, with significant increases in the proportion of clients who had a recent risk assessment and appropriate equipment in use. Documentation of any ulcers found had also improved. These changes in practice were sufficient for us to hypothesise that if they were reinforced we would see a significant reduction in prevalence in the longer term. This hypothesis was confirmed a year later, following the implementation of strategies to further reinforce the practice changes, when the prevalence of pressure ulcers was found to have halved; a very significant result.

Interestingly, apart from the increased use of appropriate pressure relieving or reducing equipment, no further improvements in the practical application of the AWMA guidelines were measured. Therefore, the reduction in prevalence may be mainly attributable to the provision of appropriate equipment. This attribution is of particular importance to the role of equipment in the prevention of pressure ulcers and is consistent with our finding at baseline, that individuals without the appropriate equipment in place were three times more likely to have a pressure ulcer than those who were provided with suitable equipment and were using it [14]. It is also consistent with the fact that when the AWMA guidelines were being developed, a higher level of evidence was found for the use of special mattresses or beds for individuals at high risk of developing a pressure ulcer, than for any of the other recommendations [15], and with the recent results of the PRIME study showing a significant relationship between having a pressure ulcer and not having appropriate equipment [16].

Our finding in relation to equipment should not be taken to indicate that it is possible to simply provide the appropriate equipment and ignore the rest of the guidelines. The provision of the appropriate equipment is of course determined by a risk assessment, which in addition assesses all the other factors that have been identified as making someone more at risk for pressure ulcer development. Further analysis of our data set for the three prevalence surveys in relation to the other risk factors measured is yet to be undertaken. However, the findings of the current study do lend support to the notion that it is essential for the effective implementation of clinical guidelines to prevent pressure ulcers, that equipment is readily available and accessible. As part of this project Silver Chain committed substantial resources to the purchase of equipment and the establishment of an equipment ordering and supply process in which priority for equipment is determined by the individual pressure ulcer risk score.

Whether the clients and their carers played a role in ensuring that they had the correct equipment is also not known. The project did include the development and distribution of client and carer information booklets, as well as regular articles in the client newsletter. Either or both of these strategies, as well as the prevalence surveys themselves, may have prompted the individual or their carer to identify that they were at risk and caused them to seek follow-up with the care staff to prompt the timely provision of pressure reducing or relieving equipment.

Limitations of this study

The effectiveness of implementing the AWMA guidelines was only assessed for home care clients with severely restricted mobility. Except in the case of palliative care and home nursing clients the new work practices that have been implemented across the organisation only apply to individuals who are assessed, at entry to the service or at review, as having severe mobility impairment. Therefore, the effectiveness of the intervention has been demonstrated only with this type of client. The decision to restrict the requirement that pressure ulcer risk be assessed to only these home care clients was made for pragmatic and resource reasons. Firstly, many clients who require just assistance with domestic tasks are currently assessed only over the phone if they are found to be self-managing. For this reason, if they are assessed as having severe mobility problems that put them at risk of developing a pressure ulcer they are sent a letter telling them they may be at risk. This is accompanied by a booklet suggesting what they or their carer needs to do to address their risk. Secondly, even two or three extra minutes per home assessment in an organisation undertaking approximately 500 assessments each month has significant resource implications and was only considered to be a cost effective process for higher risk individuals.

Therefore, the prevalence estimates generated by this study cannot be compared to other studies that have estimated the prevalence of pressure ulcers among the total home or community care/nursing client populations. Nor do they provide an estimate of the prevalence of pressure ulcers among the Silver Chain home care or home nursing client population more generally.

Implications for further research

This study has clearly demonstrated that the introduction into Silver Chain of the AWMA *guidelines* via their incorporation into the protocols for everyday work practices and staff training programs, resulted in positive changes in work practice and ultimately a reduction in the prevalence of pressure ulcers. However, whether these findings have been maintained in the longer term is presently unclear. Evidence from the routine reports produced would seem to indicate that risk assessment is not being conducted on all individuals for whom it is indicated. Nor do the reports that routinely compute pressure ulcer prevalence indicate that the original gains made have been sustained. Whether this result is due to under-reporting of healed ulcers or a real increase in prevalence is not clear.

A further prevalence study is needed to accurately ascertain the current prevalence of pressure ulcers, and if as we suspect work practices have slipped somewhat, a qualitative study is required. Such a study would need to focus on the barriers and enablers to adoption and maintenance of new work practices. Alternatively research could be conducted that tested one or more strategies for maintaining practice change. Better still, a project which combined both approaches would have immense value.

Finally, there are other personal risk factors besides reduced mobility, for the development of pressure ulcers. A prevalence study among Silver Chain clients with a greater range of risk factors is needed to determine whether the current work practices need to be directed towards a broader client group if we are to prevent as many pressure ulcers as possible.

Conclusion

The introduction of the AWMA guidelines *Clinical Practice Guidelines for the Prediction and Prevention of Pressure Ulcers* via the development and implementation of new work practices and associated training, was successful in reducing the prevalence of pressure ulcers among home care clients with mobility problems. Further research is required to ascertain whether the reduced prevalence rate has been maintained or further decreased, and whether staff maintained the new work practices over subsequent years.

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