

ORIGINAL ARTICLE

The retention effect of staff education programme: Sustaining a decrease in hospital-acquired pressure ulcers via culture of care integration

Abbas Al Mutair^{1,2,3} | Alya Al Mutairi⁴  | Deborah Schwebius⁵

¹Research Center, Almoosa Specialist Hospital, Al-Ahsa, Saudi Arabia

²Princess Nourah bint Abdulrahman University, Riyadh, Saudi Arabia

³University of Wollongong, Wollongong, New South Wales, Australia

⁴Department of Mathematics, Faculty of Science, Taibah University, Medina, Saudi Arabia

⁵Nursing School, MSN Aspen University, Denver, Colorado

Correspondence

Abbas Al Mutair, Research Center,
Almoosa Specialist Hospital, Al-Ahsa
5098, Saudi Arabia.
Email: abbas4080@hotmail.com

Alya Al Mutairi, Department of
Mathematics, Faculty of Science, Taibah
University, Medina 54321, Saudi Arabia.
Email: amutairi@taibahu.edu.sa

Abstract

Hospital-acquired pressure ulcers (HAPUs) negatively affect patients during hospitalisation, putting patients at risk for further complications. HAPUs are one of the hospital quality key performance indicators (KPIs) that necessitate quality initiatives and/or programmes to minimise its occurrence and consequences. When quality initiatives are put into place and proven effective, the next important focus is sustainability of the effects. The original Saudi Arabian study based on data collected from 50 441 patients, showed that implementation of the pressure ulcer prevention programme (PUPP) was successful showing a statistically significant reduction of HAPUs from 0.20% in 2014 to 0.06% in 2018 (P value $<.001$). The aim of this follow-up check of the original study was to assess if the PUPP's effectiveness success was retained. Also, to try and determine why the implemented quality improvement programme to prevent HAPUs was so successfully retained. Designed and conducted as a systemic review, it tracked the outcomes of pressure ulcer rates during and post PUPP implementation that mostly focused on evidence-based staff education, concentrating on years 2016 to 2018. Statistically significant reductions were captured by data that have been presented through Pearson Chi squares. HAPU decline was notable between year 2017 and 2018. This was followed by a further reduction in year 2018. The results determine retention effect sustainability of the initial positive results achieved. By doing so, the study was further able to establish that the PUPP had been integrated into the hospital system's care culture as evidenced by the reduction of HAPUs despite a large inpatient growth. Consideration of what contributing factors led to this successful

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integration of new knowledge into the care culture are also examined. KPIs can be used as indicators to help reinforce staff education. Culture of care (support of values and interventions taught during the PUPP) offer hope that these may be duplicated in future improvement projects. The supportive nature of a given culture of care may in fact be just as important as the practical education provided to staff members.

KEYWORDS

culture of care, hospital-acquired complications, hospital-acquired pressure ulcer, knowledge workers, pressure ulcer prevention programme

1 | BACKGROUND

Prolonged periods of time in a hospital for patients is one of the iatrogenic sources of additional complications for hospitalised patients. As such, they increase the cost of treatment and may increase the length of time spent in hospital. Furthermore, hospital-acquired complications (HACs) are a major problem facing healthcare facilities, because of the development of pressure ulcer, pneumonia, and infection including those from surgical sites. All of which can be managed and rescued via providing education to hospital staff.¹

The focus of this paper is the specific KPI of hospital-acquired pressure ulcer (HAPU) prevention. Besides the fact that all HACs are costly, they also have high impact on the medical condition.² HAPUs are considered preventable through the implementation of evidence-based prevention programmes.² Prevention of HAPUs has increasingly become the central focus of healthcare facilities because of many reasons including the impact of being one of the reportable hospital performance metrics, known widely as key performance indicators (KPIs). Significant reduction of HAPUs, such as achieving a 0% occurrence, is very difficult although it is attainable through comprehensive (inclusive of discharge programmes) and sustainable preventive measures.³ Fundamental elements of such preventive programmes measure ought to include: implementation of evidence-based practices, evidence-based product selection, and healthcare providers' education to hospital staff.⁴

Pressure ulcer prevention programmes (PUPPs) have been proven effective by countless studies in the literature. Many prevention programmes for hospital-acquired pressure ulcers (HAPUs) have been developed and implemented worldwide, resulting in positive outcomes that are statistically significant. One particular systematic review of the literature discovered that the preponderance of the data showed improved HAPU prevention resulted from nurse-focused intervention programmes. It

Key Messages

- continuous quality improvement considerations should not be limited to only monitoring KPI retention effect by management
- quality KPI measurements should be used as a tool by all staff
- changes in KPIs that indicate a resurgence of previously reduced indicators such as PU need to be a caution to revisit education efforts
- concluding that retention effects of PUPPs are worth the effort and can have long term effects if carried out in supportive and respectful environment
- involving staff with implementation of updated policy and procedures, and setting documentation requirements in addition to KPI tracking, will reinforce new behaviors in a strong Care Culture

concluded by suggesting further research should be conducted in order to establish what circumstances led to the failure or success of specific interventions.⁵ Although various PUPP intervention strategies were implemented in each programme—all used early risk assessment, skin assessment, detection and staging of pressure ulcers (PUs), and the implementation of HAPU prevention strategies. This paper aims to explore why some programmes are more effective and/or have better positive retention effects.

One 4.5-year study conducted at a not-for-profit 548 bed, two-hospital system in Florida showed a reduction of all HAPUs by 81%. Their PUPP used electronic medical records (EMRs) to link risk assessments to pressure relief measures and related protocols.⁶ Another study that took place in a Texas ICU reduced HAPU rates

from 30% to 0%. Its focus was on peer-to-peer accountability and accurate skin/wound assessment.⁷ While another study focused on prophylactic use of colloidal barrier dressings on determined high risk to develop HAPU category patients.²

The main PUPP study offered up for follow-up consideration is one that took place in a Saudi Arabian 360 bed tertiary hospital. The PUPP was carried out over 5 years and focused on three parts: creation of wound care team, providing education to hospital staff and including patients and their families, and lastly carrying out continuous data monitoring. This retrospective comparative study indicated a reduction of HAPUs from 0.20% to 0.06%.⁸

HAPUs are a KPI concern around the globe and guidelines have notably established by the European Pressure Ulcer Advisory Panel (EPUAP). Originally published in 2009 with a second edition published in 2014, and the latest updated in 2019, the guidelines provide evidence-based support that covers prevention, intervention, and treatment. Consideration of a variety of patient populations were addressed, including those in adult ICUs.⁹ Individual health organisations are left to develop customised PUPP of their own determinations based on population demographics, specific requirements and care culture.

2 | STUDY PURPOSE

To follow-up and determine if the successes made with the Saudi Arabian PUPP from the original study were in fact sustainable. Whether or not the *retention effect* of the programme was able to be captured, measured, and analysed. To accomplish this, a systematic review was undertaken to test the effectiveness of developed programme to follow-up and examine the efficiency (*retention effect*) of the education provided to staff from the PUPP. Consideration was also given to how to maintain positive gains and retention effect of the PUPP. Correlations, statistics, and Chi-square test were used to express the encouraging findings.

3 | METHODOLOGY

3.1 | Design

This present study is designed and aimed to follow-up and examine the efficiency of the pressure ulcer prevention programme (PUPP) that was introduced to hospital staff backed in years 2016 to 2018, pertaining specifically to hospital-acquired complications of pressure ulcers

(HAPUs). This study used a Braden scale risk assessment from the time of patient arrival to hospital, either through the emergency department or from other outpatient services. Staff were then instructed to follow guided instructions and conduct appropriate interventions accordingly. This study differs from previous research in that patients were directly enrolled to the trial in the emergency department (ED) whereupon they were followed through to the intensive care unit (ICU) and then tracked until their eventual discharge.¹⁰ The study was based on the fact that some patients often spend prolonged periods of time in the ED and/or the operating theater (OR). This time can amount to many hours, and it has been suggested that the pressure ulceration detected in ICU is actually the result of tissue damage performed before ICU admission, in the ED.¹⁰ The original study also calculated the actual cost of treating HAPUs for each stage developed in ICU. Said study also included calculations of the average length of hospitalisation secondary to a HAPU event. An exempted approval to conduct the study was received from the Institutional Review Board of the concerned hospital. Prior to analysis and interpretation of the results, data were deidentified and kept secured.

3.2 | Data analysis

A PUPP was introduced to public hospital staff in Saudi Arabia at the beginning of year 2016. With that, the study was able to extract yearly data of inpatient counts and the recorded HAPU count from the centralised hospital record system, for data analysis. The data records extracted range from year 2016 to 2018. HAPU rates considered are one of the KPIs that are routinely tracked. Definitive correlation can be seen between decline of HAPU rates and start of PUPP implementation. Stata version 15.0 was used to conduct the analysis.

Figure 1 depicts the number of recorded inpatients from the hospital involved in the education programme. From the

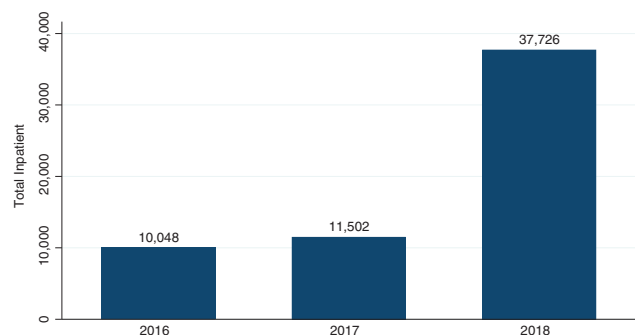


FIGURE 1 Number of inpatients recorded from year 2016 to 2018

TABLE 1 Results of cross-tabulation between year and HC Tabulate HC Year (fweight = Count), Chi square column

Key Hospital-acquired pressure ulcer (HAPU)	Frequency column percentage			
	Year			Total
	2016	2017	2018	
No	10, 043	11, 495	37, 720	59, 258
	99.95	99.94	99.98	99.97
Yes	5	7	6	18
	0.05	0.06	0.02	0.03
	10, 048	11, 502	37, 726	59, 276
	100.0	100.0	100.0	100.0
Pearson Chi square (2) = 7.3672			Pr = .025	

Note: Result of Pearson's Chi square ($\chi^2 = 7.3672$, P value = .025) was significant at .05 significance level. This indicated that there are significant different percentages of HAPUs between the years. In a more detailed analysis, the study divided the analysis into years 2016–2017 as shown in Table 2, and years 2017–2018 as shown in Table 3, respectively.

TABLE 2 Results of cross-tabulation between year (2016–2017) and HC tabulate HC Year (fweight = count) if year <2018, Chi square column

Key Hospital-acquired pressure ulcer (HAPU)	Frequency column percentage		
	Year		Total
	2016	2017	
No	10, 043	11, 495	21, 538
	99.95	99.94	99.94
Yes	5	7	12
	0.05	0.06	0.06
	10, 048	11, 502	21, 550
	100.0	100.0	100.0
Pearson Chi square (1) = 0.1187		Pr = .730	

TABLE 3 Results of cross-tabulation between year (2017–2018) and HC tabulate HC Year (fweight = Count), if year >2016, Chi square column

Key Hospital-acquired pressure ulcer (HAPU)	Frequency column percentage		
	Year		Total
	2017	2018	
No	11, 495	37, 720	49, 215
	99.94	99.98	99.97
Yes	7	6	13
	0.06	0.02	0.03
	11, 502	37, 726	49, 228
	100.0	100.0	100.0
Pearson Chi square (1) = 6.7474		Pr = .009	

bar chart, about 10 000 inpatients were recorded in 2016, which increased to about 11 500 in 2017. In year 2018, it is not difficult to detect a significant increase in the number of

inpatients. This is most likely because of an organic increase in admissions to the hospitals and also changing policies of hospitals to accept insurance claims from inpatients.

4 | RESULTS

The study presents the cross-tabulation results together with Pearson's Chi-square test for year and category of HAPUs as shown in Table 1.

From the outputs, there is no significant difference in the percentage of HAPUs between year 2016 and 2017 ($\chi^2 = 0.1187$, P value = .730), but there is a significant difference in the percentage of HAPUs between year 2017 and 2018 ($\chi^2 = 6.7474$, P value = .009). Additionally, the percentage of HAPUs was further reduced to 0.02% in year 2018. These findings indicated that the pressure ulcer prevention education programme (PUPP) has retention ability when it comes to HAPUs. Most importantly, after 3 years of implementation, the percentage (%) of HAPU among inpatients has further dropped. This demonstrates effectiveness and integration of knowledge obtained via PUPP.

5 | DISCUSSION

Positive effects of projects and programmes are the goals of, but are not end points, when dealing with continuous quality improvement. Maintaining the positive effects, which have been attained through provision of quality improvement strategies, is fundamental to continued success and sustainability of these key quality performance improvements. The role of the healthcare leaders is to not only create opportunities for improvements, like PUPPs, in safe quality care but also to nurture a culture of safety for the delivery of that care.¹¹ There are, of course, many aspects to the creation of a care culture of safety. Prevention of HAPUs is one patient safety initiative. With turnover and increasing demands made on frontline staff, leadership must consider whether or not investment into large education programmes, and if efforts are cost effective in the event that trained staff being trained leaves. Newly introduced organisational knowledge to staff, in the form of a PUPP, must influence both the individual's knowledge creation as well as the group/team knowledge. Individual and group/team knowledge will then both influence new team members and also strengthen organisational knowledge. Once this new knowledge has been retained and integrated, newly entering individuals to the group/team will automatically be influenced by both the group and by the organisation.¹² Maintaining outcomes becomes part of the culture of care responsibilities. A supportive and positive care culture can sustain advances in care that have come from knowledge imparted through education programmes like PUPPs. Without a supportive culture, it has been noted/shown that sustained change has little chance of being integrated and successful.¹³

All participants, including management team, are role models for behaviour. When behaviours are established throughout the care culture, new employees will have positive peer pressure role models at all levels of the organisation.¹⁴ This results in retention of a collective knowledge and the effects of these new behaviours can be measured for validation through KPIs. HAPU tracking serves to both validate and reinforce healthcare knowledge workers to integrate the new behaviours adapted through the new knowledge acquired.¹⁵ However, there are other important contributing factors of success to keep in mind. Acknowledgement that healthcare professionals are knowledge workers is an important consideration when developing and delivering quality improvement programmes.¹⁶ The term 'knowledge worker' is one introduced in 1959 by Peter Drucker.¹⁷

The expression, knowledge worker, describes one who thinks for a living. Having the ability to access and apply facts and theories gained through years of training and experience hence making knowledge the main capital used to complete one's work qualifies nursing to be considered a knowledge worker profession alongside other professions such as physicians, engineers, lawyers and scientists.¹⁷ Nurses demonstrate that they belong in this category when they foresee and fix problems, prioritise care and competing demands, detect patterns and indications, all the while applying evidence to their assessments and care.^{18,19} Organisations that support evidence-based education, quality of care, and strive for improved patient outcomes are more likely to be in alignment with knowledge workers needs and expectations.

New tools, procedures and processes like those found in PUPPs will only have the appropriate effect if they are compatible with the organisation's culture of care. Quality improvement initiatives have a much greater chance of acceptance, integration and retention if the hospital culture and values support knowledge workers' expectations. This alignment of cultures is very important to nurture a collective culture and knowledge. Therefore, PUPPs and any other quality improvement initiative should make sense, be evidenced-based, be respectful and therefore engage the individual knowledge worker so that participation and involvement is guaranteed.¹⁵

The original Saudi study's aim was to find and use strategies that would increase overall education level about PUs. To re-educate nurses about the importance of skin assessment, PU prevention techniques and intervention to use according to policy. To include and educate patients and family members as care partners, thereby decreasing hospital-acquired PU development in the ICU, this was achieved through education and supported through the care culture that integrated families and acknowledged nursing staff. The Saudi follow-up study

was to determine if the original educational and subsequent KPI improvement gains had retention effect, and this was verified. The care culture had integrated the HAPU prevention strategies as part of care being provided by staff and by families.

Despite the fact that this 360-bed tertiary Saudi hospital had a shortage of proper beds and mattresses, it was still able to reach an almost zero HAPU incidence.⁸ Unlike some PUPPS it did not use new equipment or devices as interventions. Instead it focused on a multi-disciplinary team that was inclusive of patients and patient family members through education and a patient-centred care (PCC) approach. The successful outcomes that resulted from this PUPP are a testament to the importance of the care culture.

Having a strong and positive culture of care in a hospital that is nurtured by the management leadership predisposes its' knowledge workers to accept and adopt new knowledge and integrate it into their professional practice. Hospital culture that supports evidence-based care, which invests in education, and has a PCC approach are significant predictors of success. Perhaps as significant to positive patient outcomes as are what the specific prevention interventions are. This is supported by the fact that positive outcomes were measured notwithstanding differences in overall interventions used in the various PUPPs.⁵

HAPU reduction is achievable for institutions no matter their size or their financial resources. In the original study, education was only 'device' used for stimulating positive results in regards to HAPUs.³ A care culture that is in alignment with a healthcare team of knowledge workers, the resulting *retention effect* of sustained new knowledge and behaviour outcomes can be measured for validation via KPIs. In this study, no new equipment or products were introduced coinciding or included within the PUPP. The correlation between PUPP and KPI statistic that measured reduction HAPU is further strengthened by the overall increased quantity of inpatients during the tracking period. In addition to capturing the actual KPI measurement, the follow-up study reinforces the idea that tracking KPIs can serve to both validate and reinforce healthcare worker knowledge. Thereby helping to integrate the new behaviours adopted through the new knowledge acquired.²⁰

This study had several limitations, first, the retrospective nature of the design and the risk of selection bias and misclassification. The study findings may not be generalised to other settings as the study design was only retrospective observational rather than randomised control trial. Nevertheless, our study's findings will add to local and global data on hospital acquired pressure ulcer

prevention interventions and reinforce the importance of maintaining a strong Culture of Care.

6 | CONCLUSION

Although a helpful tool, continuous quality improvement considerations should not be limited to only monitoring KPI retention effect by management. KPI measurements should also be used as a tool by all staff use in supporting and improving the care culture. Conversely, changes in KPIs that indicate a resurgence of previously reduced indicators such as PU need to be a caution to revisit education efforts to further boost the retention effects as they may be slipping.

By creating a culture of care through continuing to respect healthcare workers as knowledge workers and moving forward as partners in the delivery of safe and responsible care, future successes are more likely. As will be the ability to build upon the success that has already been achieved. Involving staff with implementation of updated policy and procedures, and setting documentation requirements in addition to KPI tracking, will reinforce new behaviours in a strong care culture.

Maintaining change is best done through acceptance and integration of new behaviours and systems into the working care culture. Shared collective knowledge, positive peer pressure through role modelling, and a healthy care culture allows for the best chance of integrating quality improvement measures. This despite which KPI measured or the perspective used to evaluate the implications of KPI statistics.

Forming such a culture is complicated, long-lasting process, and success is not guaranteed. Through use of KPI measurements, this particular PUPP was shown to be effective and sustainable. Concluding that retention effects of PUPPs are worth the effort and can have long term effects if carried out in supportive and respectful environment.

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CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

Data are available upon request, please contact author for data requests.

ORCID

Alya Al Mutairi  <https://orcid.org/0000-0003-4181-6279>

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