

Annotated Bibliography on Technology in Nursing

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Technology in Nursing

A pressure injury is an area of localized damage to the skin and underlying tissues. Patient positioning is an essential nursing intervention and prevention strategy, as limited mobility is a significant risk factor in developing pressure injuries (Gillespie et al., 2021). The currently accepted standard of care is turning patients at least every two hours day and night. Issues with turn compliance, documentation of turns, and effectiveness of turning at offloading are ongoing issues. Two technologies of interest for addressing these issues are wearable patient sensors and pressure mapping devices. Wearable patient sensors measure body position and provide feedback promoting optimal turning practices (Pickham et al., 2018). These sensors can automatically document turns in the patient's electronic medical record. Many pressure mapping devices are in use manufactured by various brands. Most consist of a pressure sensing mat and a monitor that shows real-time data retrieved from sensors within the mat depicting how pressure is distributed (Gunningberg et al., 2017). This data allows caregivers to adjust the patient position to relieve higher pressure, as shown on the monitor. I chose these technologies because I am a wound and ostomy care certified nurse working in a 500-bed acute care facility. My facility, not unlike many others, has had a 200% increase over the past two years in hospital-acquired pressure injuries. I used the Summon search engine in the Capella library to search for terms such as "wearable patient monitor," "pressure injury," "pressure injury prevention," and "pressure mapping." I narrowed the search results by checking the boxes for peer-reviewed and setting the time frame for five years.

Annotated Bibliography

Gunningberg, L., Bååth, C., & Sving, E. (2017). Staff's perceptions of a pressure mapping system to prevent pressure injuries in a hospital ward: A qualitative study. *Journal of Nursing Management*, 26(2), 140–147. <https://doi.org/10.1111/jonm.12526>

The authors of this article examine staff perception of a pressure mapping system to prevent pressure injuries. The authors speak of the negative impact of pressure injury on patients and the financial impact on healthcare facilities. The article cites the National Pressure Ulcer Advisory Panel (NPUAP) guidelines regarding preventative measures. The article emphasizes the nurse's important role in pressure injury prevention but acknowledges that nurses lack knowledge in interventions to prevent pressure and shear. The article describes implementing a pressure mapping system in a hospital ward. The article concluded that the staff found the pressure mapping system informative and were appreciative of the real-time feedback and alerting features. I chose this article because it addresses the lack of knowledge amongst many nurses regarding pressure injury prevention. Knowledge is empowering, and truly understanding why we do these interventions, and visual proof enables nurses to practice safely and effectively.

Pickham, D., Berte, N., Pihulic, M., Valdez, A., Mayer, B., & Desai, M. (2018). Effect of a wearable patient sensor on care delivery for preventing pressure injuries in acutely ill adults: A pragmatic randomized clinical trial (Is-hapi study). *International Journal of Nursing Studies*, 80, 12–19. <https://doi.org/10.1016/j.ijnurstu.2017.12.012>

This article examines the impact of a position-sensing wearable patient sensor on care delivery, mainly turning in acutely ill patients. This article quotes the NPUAP and other authors on the prevalence of hospital-acquired pressure injuries (HAPI) and the impact on

facility reimbursement. The article states the standard of care regarding turn interval and quotes other studies showing non-compliance with these protocols. The authors describe the implementation of a wearable sensor in two acute-care intensive care units. The article concludes that optimal turning was greater with a wearable sensor, turn compliance was increased, and a statistically significant protective effect against the development of HAPI. I chose this article because it shows the importance and impact of accountability on increasing compliance.

Rose, A., Cooley, A., Yap, T. L., Alderden, J., Sabol, V. K., Lin, J.-R., Brooks, K., & Kennerly, S. M. (2022). Increasing nursing documentation efficiency with wearable sensors for pressure injury prevention. *Critical Care Nurse*, 42(2), 14–22.

<https://doi.org/10.4037/ccn2022116>

The authors of this article examine the effect of a wearable patient sensor on the documentation of patient repositioning. The article discusses the standards of care for patient positioning and defines pressure injuries. The importance of documenting repositioning is stated due to missed documentation opening healthcare facilities up to litigation as this is considered missed care. The authors described the implementation of the wearable device in an acute care facility. The article states that the sensor can sense all patient position changes that meet specific criteria, including patient self-positioning. The article goes on to describe what is required to meet the repositioning goal. The article concluded that turns were documented 2.5 times more frequently using the wearable sensor. Also, obese patients, who previously had documented position changes half as frequently as non-obese patients, were just as likely to be repositioned when using the wearable sensor. The article also describes the time-saving ability of decreased nurse

manual documentation allowing nurses to spend more time in patient care, increasing patient satisfaction and safety, and decreasing nurse burnout. This article was chosen because I was recently deposed in a HAPI lawsuit. After reviewing the nursing documentation, I was appalled at the lack thereof. Based on my review of the turning documentation, the nursing care did not meet the minimum standards of care. I feel that this technology would significantly improve turning documentation and save time for nursing staff.

Sving, E., Bååth, C., Gunningberg, L., & Björn, C. (2020). The experiences of operating room teams working with real-time feedback of interface pressure to prevent pressure injuries—a feasibility study. *Perioperative Care and Operating Room Management*, 20, 100096. <https://doi.org/10.1016/j.pcorm.2020.100096>

The authors of this article examined the experience of OR team members with using pressure mapping to prevent pressure injuries in the intraoperative and postoperative periods. This article defines pressure injury and lists risk factors. The article identifies that surgical patients are at high risk for pressure injury and gives statistics on the prevalence of postoperative pressure injuries and risk factors. The article states the impact of pressure injuries on patients and the healthcare organization. The article states the challenges of pressure injury prevention related to surgery. The article describes implementing a pressure mapping system in an operating room. The article states a significant variance of pressure on the skin amongst the different patients, highlighting the importance of real-time feedback from the pressure mapping system. The authors note that the staff described increased awareness of pressure injury prevention related to the real-time pressure data that aided them in positioning patients. The authors conclude that

technologies that provide real-time data on pressures could play an essential role in pressure injury prevention in the future. I chose this article because it speaks to the importance of having real-time data on pressure so that staff can have increased awareness to facilitate effective repositioning.

Conclusion

Pressure injuries are an ongoing issue for healthcare facilities that can lead to litigation and loss of reimbursement. Pressure injuries can cause significant patient harm financially and be detrimental to their health. Using pressure mapping and patient position sensor devices can substantially improve patient care and documentation of that care.

One organizational factor influencing the selection of these technologies would be cost. These technologies would need to demonstrate cost savings for the facility. Other considerations would be care staff initiative and adherence to the use of the technologies to achieve the best outcomes for patients.

I would recommend implementing both technologies in the quest to reduce and eliminate hospital-acquired pressure injuries. Pressure mapping measures and provides visualization in real-time of patient tissue pressure and increases clinician awareness (Sving et al., 2020). Furthermore, the feedback from pressure mapping alerts staff that it's time to reposition, facilitates repositioning, and provides feedback on the repositioning performed, increasing staff competence, focus, and awareness (Gunningberg et al., 2017). Wearable patient position sensors increase compliance with turn policies and demonstrate a significant protective effect against the development of HAPI (Pickham et al., 2018). In addition, repositioning can be automatically documented and has been shown to be

documented 2.5 more frequently. Incomplete documentation can be considered missed care and lead to litigation. Automatic documentation of repositioning can save time for nurses and decrease the risk of burnout (Rose et al., 2022).