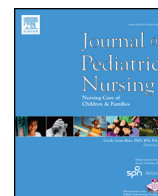




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Improving the Visibility of Intravenous (IV) Site in Pediatric Patients to Reduce IV Site Related Complications – An Evidence-based Utilization Project

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ABSTRACT

Purpose: This project aims to improve the visibility of the IV site using more adhesive transparent dressings to attain 90% compliance based on the frequent and proper inspection of the IV site and decrease the incidence of IV complications.

Design and Method: The project was conducted in a 43-bedded general pediatric ward from March 2016 to February 2017. To address the poor visibility of the IV site due to bandaging caused by poor adhesive strength of the IV securement dressing, a more adhesive securement dressing was introduced. The study team conducted pre-implementation, immediate post-implementation, and sustainment audits, cost-analysis, and comparison of the number of reported occurrences of phlebitis and extravasation between 2015 and 2017.

Results: The post-implementation audit showed 100% visibility of the IV site, from 73% pre-implementation, and 87% compliance on frequent IV site inspection, from 70% pre-implementation. Both criteria attained 100% compliance during the sustainment audit. Incidences of extravasation and phlebitis were reduced from eight to seven, an improvement of 13%. These seven cases were also generally less severe compared to those from the previous year.

Conclusion: This project has greatly improved the visibility of the IV site as well as nurses' compliance in checking the IV site. This is because nurses can monitor the IV site without having to remove any additional bandage over the site and causing unnecessary distress to fretful pediatric patients.

Implications: The use of an adhesive transparent dressing can lead to prevention and earlier detection of phlebitis and extravasation. Additionally, the new IV securement dressing brought about manpower cost savings enabling staff time directed to other patient care activities.

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Introduction

Peripheral intravenous (IV) cannulation is a common procedure for patients during hospitalization. It is the insertion of a plastic cannula into the vein for hydration, nutrition, and medication administration. In pediatrics, this procedure is a traumatic experience for children and their caregivers (Heinrichs, Fritze, Vandermeer, Klassen, & Curtis, 2013). The trauma and fear can leave an enduring impact on children, thus IV cannulation should not be done more than what is needed (Hetzler, Wilson, Hill, & Hollenback, 2011). To secure the IV cannula, proper anchoring to prevent an accidental dislodgement is of paramount importance (Malyon et al., 2014). Securing the cannula is a concern in children as they have a limited understanding of the need for the cannula to remain in place. After the cannula insertion, children tend to be agitated and fretful, which is especially so in the younger group.

Hence, children in the younger group population have a higher risk for accidental dislodgement, resulting in re-cannulation and changing of securement dressing anchoring the IV cannula (Levy, Bendet, Samra, Shalit, & Katz, 2010).

IV cannulas are generally secured with a splint, an anchoring tape, and a bandage (Hetzler et al., 2011). The practice within our institution is to secure the IV site with two transparent dressings, followed by splinting and bandaging with crepe bandage as nurses commented that the dressings did not adhere properly to skin. However, this led to a poor visibility of the IV site, and nurses often need to remove the bandage for inspection, then reapply the bandage. Doing so inflicts unnecessary stress upon children and their caregivers, which may then impede nurses' efforts for IV site inspection. This hinders frequent checks of the IV site, thus preventing early detections of IV complications such as phlebitis, infiltration, or extravasation. The most common complication, phlebitis, is the inflammation and swelling of a blood vessel, presenting with redness, warmth, and tenderness (Marsh, Webster, Rickard, & Mihala, 2014). The next most common complication is

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infiltration, which results from the infusion of fluid into the tissues surrounding the IV cannula due to impaired blood vessel integrity (Helm, Klausner, Klemperer, Flint, & Huang, 2015). Lastly, extravasation refers to any unintended infiltration of cytotoxic or vesicant drug into the tissues (The Royal Children's Hospital Melbourne, 2014).

Incidences on IV complications reported in the electronic Hospital Occurrence Report (eHOR) is one of the key areas monitored for patient-related incidences in our institution. In 2015, one of the eight reported IV complications in the project institute was a severe extravasation case that required plastic surgery, leading to prolonged hospitalization, which caused trauma and distress to the child and his caregiver. In addition, the hospital also incurred revenue loss. According to the Joanna Briggs Institute, transparent dressing (Grade B) provides a clear visibility of the IV site for inspection to minimize complications (Grade A) (Fong, 2014). Bandaging the IV site is not advisable. The aim of this project was thus to improve the visibility of IV site using a more adhesive transparent dressing to attain 90% compliance on frequent and proper inspection of the IV site and decrease the incidence of IV complications. Proper inspection of the IV site include physical check of cannula insertion site, area within/around the IV cannula site, feel for any swelling or warmth, and asking the patient if there is any pain/discomfort.

Method

This project adopted the revised version of Model for Evidence-Based Practice Change (Larrabee, 2009). The model consists of six steps, which includes 'assess the need for change in practice', 'locate the best evidence', 'critically analyze the evidence', 'design practice change', 'implementation and evaluate change in practice', and 'integrate and maintain change in practice' (Fig. 1).

Ethical Consideration

Ethical approval from the hospital's institutional review board was not required as this was a quality improvement project. The head of the department and higher management provided immense support during the execution of the project.

Assessing the Need for Change in Practice

Root cause analysis found that delay discovery of IV site complications was due to poor visibility of the IV cannula site, which was caused by bandaging of IV cannula site with crepe bandage. An audit was done to collect baseline data. The baseline audit comprised three main criteria (Appendix A): 1) whether an inspection of the IV insertion site is done, 2) whether an inspection of the IV site is done in a timely manner (i.e. at least once per shift), and 3) whether the IV cannula is firmly secured with a good view of the insertion site. The audit criteria were adopted from the Joanna Briggs Institute's evidence summary articles *Evidence summary: Peripheral cannula care: Flushing and dressings* (2011) and Yen' (2013). The pre-implementation audit found that 'the visibility of the IV site' and 'IV insertion site inspection' were issues to be addressed as compliance was low, at 73% and 70%, respectively. A survey of nurses (Appendix B) was administered simultaneously, and 50% of those surveyed cited that their main reason for bandaging the IV site was due to poor adhesiveness of the IV securement dressing. This led them to reinforce the IV site with crepe bandage, causing poor-visibility of IV insertion site (Fig. 2). These findings identified the need to source for a new IV securement dressing that is more adherent and promotes visibility of the IV insertion site.

Locating the Best Evidence

Online search for evidence included but not limited to databases of Cochrane, Pubmed and Joanna Briggs Institution (JBI), using PICO framework to form the clinical question and facilitate the search for relevant evidence (Santos, Pimenta, & Nobre, 2007). Population (P) includes in-patients in a general pediatric ward with IV cannula. Intervention (I) includes any strategy that will not hinder the visibility of the IV insertion site. Comparator (C) would be existing IV securement practice where nurses apply crepe bandage. Outcomes (O) measured were clinical outcome of IV complications reduction, and process outcome of staff compliance on IV site inspection.

The keywords for evidence search includes: pediatric patient; intravenous site; securement dressing; transparent dressing; complication; phlebitis; extravasation.

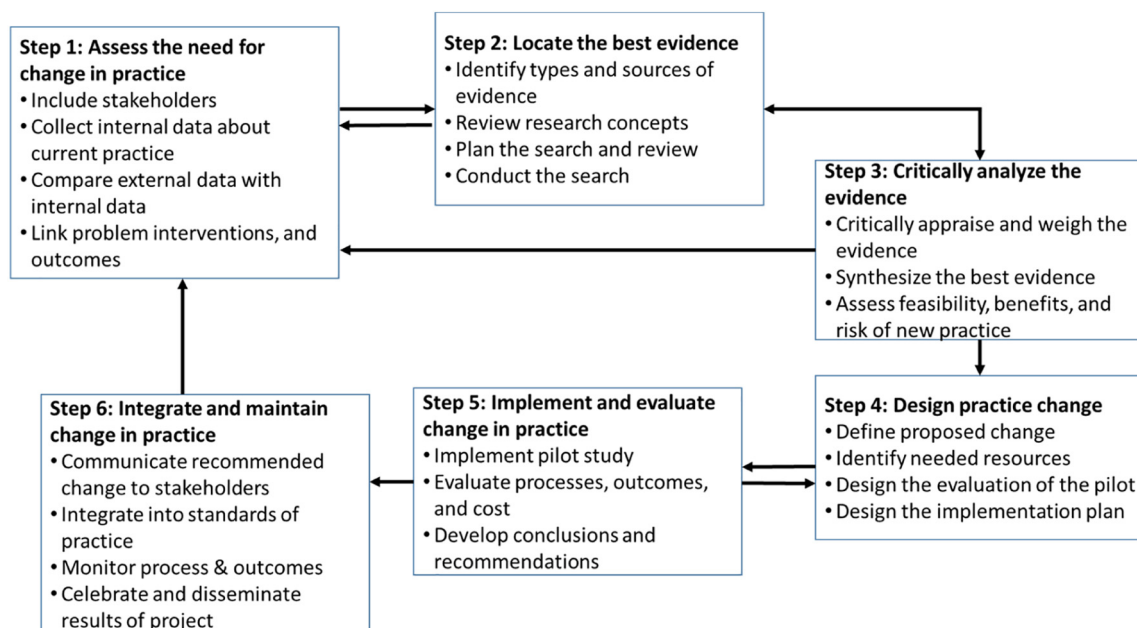


Fig. 1. Model for evidence-based practice change.

(Adopted from Larrabee, J. H. (2009). Nurse to nurse: Evidence-based practice: A step-by-step handbook. New York, USA: McGraw-Hill. Page 22.)

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