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Innovation Article

# Innovation limb splinting for intravenous cannulae in pediatric Estri Sofiyawati<sup>1</sup>, Imelda Ayunitias<sup>1</sup>, Agus Santosa<sup>1</sup>

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#### ARTICLE INFORMATION

## ABSTRACT

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**K**EYWORDS

Splints; Occupational Therapy; Child; Anxiety

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#### INTRODUCTION

Every child admitted to the hospital usually experiences hospitalization stress. Their emotional reactions to it are often shown by crying, being angry, hitting, rejecting, and so on<sup>1</sup>. One of the factors to the stress is due to medication problems. They are afraid of the treatment procedure that will be carried out because of the perception that the treatment will be painful<sup>2</sup>. Atraumatic care is needed to reduce psychological and physical distress suffered by children and the patients who get hospitalized<sup>3</sup>.

Infusion is one of the mandatory procedures performed by health workers for children who are hospitalized. This procedure is an invasive procedure that can cause pain and trauma, leaving the child in hospitalization stress. They often refuse and often even try to remove the infusion, so the procedure for infusion in children is often added with infusion fixation--often called a "spalk" or a splint. Currently, the splint used in the hospital is still confectionery, namely using wood wrapped in gauze. Besides not very attractive, a conventional splint also takes a long time to install, thereby increasing children's anxiety.

**Background:** Currently, the splint used in the hospital is not yet practical; it still requires a long installation time and causes the child to experience anxiety when the infusion is installed. Thus, a limb splinting innovation is needed to ease nurses' inserting the needle infusion and reduce young patients' anxiety.

**Technic:** This splint uses a wood material covered with foam, wrapped in a cotton fabric having cartoon printing, and it has an adhesive cloth at its bottom. It has a hole at the top to monitor the needle that goes into the vein.

**Conclusion**: This innovative splint is proven to be easier to use to fix the infusions in children. It is safer and more comfortable. It indeed can reduce anxiety symptoms in children during the infusion.

Researches on splint innovations have been conducted, one of which is the "Manakarra Spalk, "which has an ergonomic design with an easy-to-use adhesive. It concluded that Manakarra Spalk effectively reduced the anxiety level of preschool children at the time of infusion<sup>4</sup>. Another study correlated a patterned splint with the co-operation of preschool children during the intravenous injection procedure. The study results from 75.9% of children fitted with it were more cooperative than children who were given regular splint<sup>5</sup>. This study aims to combine the previous studies' two designs and test the innovated splint on its level of ease, safety, comfort, and children's anxiety.

#### TECHNIC

This splint uses a light wood material, covered with foam on its top and bottom. The cloth used is cartoon-printed cotton. At the top of the splint, there is a hole to monitor the infusion, and at the bottom, there is a cloth adhesive to fit the size of the child's arm. The splint's size is made in some variants based on their age, namely 5cm x 5 cm, 5cm x 10 cm, and 5cm x 14 cm (Figure 1). The splint is effortless; the nurse simply glues both sides and adjusts the drip hole (Figure 2). This splint can be washed or steam-sterilized and reused.

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Figure 1. Splint Design



Figure 2. Methods to Apply the Splint.

#### DISCUSSION

We have designed and innovated splint by developing previous research results, testing its use, and comparing it with the regular splint. The trial was carried out on 16 nurses in the IGD and the children's room at Ajibarang Hospital. The variable assessed is the level of ease in installing the innovation splint compared to the conventional. We also examined its use on the level of safety, comfort, and anxiety in 16 child respondents.

The trial results showed that 72.3% of the nurses said this innovative splint was easier to use than the usual splint. It also shows that the innovation splint is safer, more comfortable, and can reduce children's anxiety symptoms. The safety, comfort, and anxiety indicators of children in this study were assessed by the number of anxiety symptoms the child showed as the infusion was being done<sup>1</sup>. This innovative splint is proven to reduce the children's crying time; they are less likely to fuss, struggle, and try to remove the splint or infusion than children who are given regular splint. The foam and wood on this splint work to hold the child's hand movements, make it much safer.

This study's results support previous research on the innovation splint, namely the Manakarra Spalk. The Manakarra spalk is designed based on the anatomical structure of the child's arms so that it is comfortable to wear. This splint is also covered with a soft cloth, doll patterned, brightly colored, and equipped with a small lighted doll. The trial results showed a significant difference in preschool children's anxiety level who were given Manakarra spalks compared with those applied with regular hospital splint (p < 0.05)<sup>4</sup>. Another research conducted by Subandi found out that the patterned splint increased the preschool children's cooperative leveling the

injection procedure. This patterned splint only modifies the regular splint, given an image motif, which is attractive to children. This study combines the two designs and positively reduces hospitalization stress in children, as evidenced by decreased anxiety symptoms.

### CONCLUSIONS AND RECOMMENDATION

Innovative limb splinting is proven to be easier to use, safer, and more comfortable for children. Its safety and comfort have been proved to reduce anxiety symptoms during infusion. Health workers should use this innovative splint to reduce the stress of hospitalization for children during infusion.

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