

# Evaluation of Predisposing Factors Contributing to Catheter-Related Bloodstream Infections in Hospitalized Patients Less Than 18 Years Old: A Meta-Analysis

Maria Veronica M. Mendoza, MD; Meadina G. Cruz, MD

Philippine Children's Medical Center

## Introduction

Central venous catheters (CVCs) are frequently used in the intensive care unit and in regular wards providing immediate, and easy access for medical use. The most frequent complication of CVC use is catheter-related bloodstream infections (CRBSI) which is influenced by different catheter-related, and patient-related factors. This study aims to provide data which may aid the healthcare team to minimize, and prevent CRBSI among pediatric patients by identifying these risk factors thereby improving health outcomes, decrease morbidity, mortality, hospital stay, and reduce financial burden.

## Objective

The purpose of this study is to identify the different predisposing factors associated with CRBSI among hospitalized pediatric patients

## Methodology

A meta-analysis was done to synthesize the evidence for factors which contribute to the development of catheter-related bloodstream infections. A database search using PubMed, MEDLINE, EMBASE, CINAHL, HERDIN, Google Scholar, and the Cochrane Database of Systematic Reviews was done by the investigator. Pooled estimates of Risk Ratio was computed using the Dersimonian & Laird process. The Mantel-Haenzel test statistic was used to evaluate statistical heterogeneity

## Results

- Meta-analysis showed significant findings such as a short duration of catheter-related bloodstream infections (MD=1.69, 95% CI 1.48-1.89), and placement of CVC in the jugular vein (MD=0.71, 95% CI 0.52-0.96) with a decrease incidence of CRBSI in the pediatric population.
- Other risk factors such as the use of tunneled CVCs (MD=1.39, 95% CI 0.74-2.61), urgency of CVC placement (MD=0.87, 95% CI 0.15-5.09 , I<sup>2</sup>=84%), total parenteral nutrition (HR 0.84 95% 0.15–4.47; p value = 0.853 ; OR 8.69, 95% CI 3.518–21.484), and age (MD=1.48, 95% CI 0.90-2.44) were not statistically significant.

## Conclusion

This meta-analysis suggests that CVC-related factors such as a short indwelling catheter time, and jugular vein placement decreases the risk for the development of CRBSI. Other risk factors such as the use of non-tunneled CVC, emergency placed CVC, the use of parenteral nutrition, and sociodemographic factor were not statistically significant. Previously published meta-analysis, systematic review along in conjunction with results of this study may serve as a framework for future local protocols and guidelines regarding the use of CVCs to prevention the development of CRBSI.

## Keywords

CVC - Central Venous Catheter  
CRBSI - Catheter-Related Bloodstream Infection

