RISK FACTORS FOR PERIPHERAL INTRAVENOUS PUNCTURE IN ILL CHILDREN: SYSTEMATIC REVIEW

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INTRODUCTION

Multiple attempts to peripheral intravenous puncturing cause distress to the child, injury to treatment and risk of complications occurrences. The purpose of this study was to verify in the literature the main risk factors that can cause multiple procedures.

METHOD

Systematic integrative review performed in three indexed databases, used as descriptors pediatric nursing and peripheral intravenous catheterization for online bibliographic search. The inclusion criteria were: articles published in English, Spanish or Portuguese language; title, abstract and content that addressed the risk factors for peripheral intravenous puncture in ill children. The primary search resulted 12 studies. A secondary search was performed in the citations identified in the selected articles and more 10 researches were included. The final sample was composed for 22 studies. The time was not limited.

RESULTS

Figure 1: Types of Studies

Table 1: Description of studies

Author, Year	Objective	Results
Demir and Inal, 2017	Check the success of puncture performed in children with the use of equipment to facilitate the visualization of veins.	Children with veins classified as difficult to see, difficult to palpated and presence of some injury at the procedure site were benefited by the use of visualization equipment.
Parker et al, 2016	Identify interventions associated with the success of the first attempt to peripheral intravenous puncture for pediatric patients and hospitalized in sectors in emergency care units who require intravenous therapy.	1 - Children with veins difficult to see or not palpable were benefited by the use of visualization equipment. 2 - Early evaluation for difficult puncture improves planning for puncture.
Kiger et al, 2014	Identify practices performed during peripheral intravenous puncture.	The practices to facilitate peripheral intravenous puncturing were most frequently used in patients with difficult venous to be visualized or palpated and previous history of difficult puncture.
Graaff et al, 2013	Evaluate the success in the first attempt of puncture of 3 equipment that facilitate the visualization of veins in surgical children	Success of the puncture was higher in children who had vein difficult to see without using the equipment.
Van der Woude et al, 2013	Evaluate the success of puncture with the use of transillumination equipment in children with dark skin color.	Children who were evaluated as having veins difficult to see and not palpated had higher success in the first attempt of puncture and less time for the success of the procedure in the group that used the transillumination equipment.
Heinrichs et al, 2013	Evaluate if the ultrasound helps and increases the success of peripheral intravenous puncture.	Recommend the use of ultrasound for children with a history of difficult puncture and have chronic disease.
Kaddoum et al, 2012	Evaluate if the use of transillumination equipment increase the success of first puncture, reduces the number of attempts and time of the procedure in children.	The success of the puncture was greater in children with dark skin color compared to those with light skin when punctured with transillumination equipment.
Goff et al, 2012	Measuring cost and difficulty of performing peripheral punctures in hospitalized children.	1 - Age and hydration were factors for the high cost of catheter insertion. 2 - Children <2 years and between 2 and 5 years have suffered more than one puncture attempt and higher cost of the procedure.
Peterson et al, 2012	Check the success of puncture performed in children by nurses with the help of two devices to facilitate the vein visualization compared to the method performed by the palpation of the vein.	1 – Children with lower ages suffered more than one puncture attempt. 2 – Every 6 months increase in the age of children increases puncture success.
Negri et al, 2012	Check characteristics of children and peripheral intravenous therapy that may constitute predisposing factors for the failure of peripheral intravenous puncturing.	Factors that influenced the failure of the puncture were: clinical history of failure punctures, previous hospitalizations, previous use of intravenous therapy, use of peripheral intravenous catheter, use of tourniquet, using 24G gauge catheter and advance the child prepare.
Champan et al, 2011	Evaluate if the use of transillumination equipment to assist in peripheral intravenous puncturing of children in the emergency department reduces the number of attempts, time of the procedure and pain.	The puncture time was shorter in the subgroup of children under two years using the candling equipment.
Perry et al, 2011	Check the success of first attempt puncture performed in children by nurses with the help of devices to facilitate the vein visualization.	1 - Success of the first attempt to puncture was higher in the experimental group of children aged between 0 and 1 year with less than 10 kg and have a chronic disease. 2 - Nurses report that the device facilitated the puncture dehydrated children and who had a history of difficult puncture.
Riker et al, 2011	Validate and refine the DIVA-score.	Factors that influenced the success of the puncture on the first attempt were vein not palpable, veins difficult to see, age and hospitalization history Neonatal Intensive Care Unit.
Nafiu et al, 2010	Check the relationship between body mass index and the ease in obtaining the success of peripheral intravenous puncturing.	The group of obese children had veins difficult to see and not palpable, had less successful puncture in the first attempt, more time for the success of the procedure and higher number of attempts.
Hess HA, 2010	Evaluate the success in the first attempt of puncture, time of the procedure and number of attempts with the use of equipment to facilitate the visualization of veins in children.	Children younger than 6 years were higher successful at the first attempt puncture in the experimental group.
Larsen et al, 2010	Check the number of attempts and the time of the procedure performed by pediatric nursing.	The factors for failure in the first attempt of puncture were: children under 2 years of age, history of difficult puncture and uncooperative with the procedure.
Simhi et al, 2008	Check if the peripheral device to facilitate intravenous puncture is effective when used in healthy children.	Children with veins not palpable and difficult to see have benefited from using the device to facilitate puncture.
Yen et al, 2008	Develop a tool with clinical factors, sensitive and easy to apply, to identify children who may be difficult to be punched in the emergency department.	The variables that proved effective in evaluating children difficult to be punctured were age, history of prematurity, visibility and palpation of the vein and skin color.
Atalay et al, 2005	Check the efficacy of transillumination technique to perform peripheral intravenous puncture, when the puncture is not obtained by the traditional method.	Children to punctured using transillumination had a mean age of 20 months, with no visible or palpable vein due to intravenous therapy provided. Transillumination was 80% successful in this group of patients.
Goren et al, 2001.	Check the efficacy of transillumination by the palmar region to perform the peripheral intravenous puncture, when the puncture is not obtained by the traditional method.	The children evaluated and punctured using the transillumination had a mean age of 16.7 months, 31 had some degree of dehydration and 11 had bacterial infection. Transillumination was successful in 39 children out of 40 included in the group.
Franck et al, 2001	To determine the prevalence of complications related to peripheral intravenous puncturing and identify risk factors.	The gestational age influenced the number of attempts. Older infants were punctured more than younger.
Fein et al, 1999	Check the ability of nurses to evaluate patients who will be punctured and to determine risk factors for failure of peripheral intravenous puncture.	Children under 1 year of age, with gastrointestinal, hematologic, cardiac and oncological diseases are at higher risk to be punctured.

The researches were performed between 1999 and 2017.

DISCUSSION

The researches showed that premature children, with age < 3 years, obese, with skin dark, dehydrated, with sepsis, that have chronic diseases, vessel difficult to see and not palpable with history of multiple puncture can be punctured multiple times. Thus, it is important know the risk factors for puncture ill children to facilitate planning of the care of the intravenous therapy and reduce the multiple attempts and its consequences.

Figure 2: Guidelines for the PVP

CONCLUSION

This systematic integrative review will allow the building of the guidelines for the peripheral intravenous catheterization of the ill children.