ISSN 2354-8428
e-ISSN 2598-8727

JURNAL KEPERAWATAN KOMPREHENSIF

COMPREHENSIVE NURSING JOURNAL

Sekolah Tinggi Ilmu Keperawatan PPNI Jawa Barat

Vol. 8 Special Edition, June 2022

JURNAL KEPERAWATAN KOMPREHENSIF	VOL. 8	Special Edition	Page 1-222	Bandung June 2022	ISSN 2354-8428 e-ISSN 2598-8727

p-ISSN : 2354 8428 | e-ISSN: 2598 8727

Jurnal Keperawatan Komprehensif
Vol. 8 Special Edition Juni 2022

Review Article

The Effectiveness Of The Protective Barrier Of The Skin Against Medical Adhesive Related Skin Injury (Marsi) In Children Treated In Pediatric Intensive Care Units : Systematic Review

Juanda Mutifa[1]* | Nani Nurhaeni[2] | Dessie Wanda[3]

[1,2,3]Master of Nursing Study Program, Faculty of Nursing, University of Indonesia, Depok - Indonesia

***contact**

mutifa.irwan@gmail.com

Received : 20/03/2022
Revised : 23/05/2022
Accepted : 18/06/2022
Online : 30/06/2022
Published : 30/06/2022

Abstract

Aims: Providing medical equipment intervention increases the risk of MARSI in newborns with laceration and traumatic wounds in the subcutaneous tissue of the skin. The application of an adhesive or a skin barrier is one technique to lower the risk of MARSI. Nonetheless, past research has yielded mixed results in terms of its usefulness in reducing the risk of MARSI.
Purpose: This study is to conduct a literature evaluation on the effectiveness of using a skin barrier to reduce the occurrence of MARSI.
Methods: A systematic review of four databases was conducted, including Scopus, EBSCOhost, SAGE, and Wiley. A total of 8 publications were reviewed utilizing inclusion and exclusion criteria with a total end of article review.
Results: The application of adhesive efficiently and considerably reduces the risk of MARSI, according to 5 of 8 articles.
Conclusion: It is recommended that adhesive be used in an integrated manner on a regular basis to prevent the incidence of MARSI in babies.

Keywords
The MARSI, the Skin Barrier, and the Baby: A Systematic Review

INTRODUCTION

Medical gadgets are frequently used on children in the Intensive Care Unit (ICU) or Pediatric Intensive Care Unit (PICU). Invasive and non-invasive medical devices are required for the monitoring and management of patients who require more intensive care (1). Stiffness and inelasticity are associated with difficulty in adjusting medical devices, putting the skin under them at risk of discomfort, pressure, and harm. Moisture from the device's secretion, drainage, and diaphoresis can render the skin more vulnerable to harm (2). As a result, the usage of medical equipment might result in skin and tissue harm.

Friction, mechanical forces that separate the layers of the epidermis, dermis, or network sub disease can produce traumatic injuries (3). The skin that is torn in patients hospitalized more in the area of the neck, the forearm with an incidence rate of 3.8 percent - 17.8 percent, according to a study conducted by Hsu et al . Elastic film with a latex-free adhesive that is hypoallergenic and breathable, allowing for the exchange of oxygen and water vapor while keeping the skin moist. Furthermore,

https://doi.org/10.33755/jkk

p-ISSN : 2354 8428 | e-ISSN: 2598 8727

Jurnal Keperawatan Komprehensif
Vol. 8 Special Edition Juni 2022

due of the invasive acts, the condition of being transparent has occurred, making it simpler to evaluate the status of the skin.

When patients are getting treatment intervention, the nurse should be informed of the potential dangers. As a result, in addition to continuing to provide intervention as the primary therapy, the nurse must also be able to reduce the impact of such rips in the skin or wounds caused by injuries. Past study on this topic has been conducted, with the outcomes of the research varying, resulting in a lack of consistency and coherence in the findings of previous studies. As a result, researchers want to undertake a comprehensive evaluation of the literature on the application of skin barrier acrylate terpolymer to prevent skin injury in pediatric hospital patients. The goal of this systematic review is to see if using a skin barrier to prevent medical adhesive-related skin damage in hospitalized children is helpful.

METHODS

This writing method is a literature review with the theme raise is the the effectiveness of the protective barrier of the skin against medical adhesive related skin injury (marsi) in children. Literature reviews are simple summaries of article found related to the theme of medical related skin injury (marsi). Article summaries of the synthesis results of the journal contents include research questions, research objectives, research methods and research result. Journal searches are carried out through both national and international databases between the years 2017 and 2020, this research approach in the form of SLR (Systematic literature review) with a database search is conducted through Scopus, EBSCOhost, SAGE, and Wiley using the keywords Medical Adhesive Related Skin Injury and kid English language, full-text. Three articles used cross-sectional study designs, three articles used prospective cohort study designs, and two articles used experimental study designs. In terms of large samples, the article's average was calculated using a sample of 165 patient samples. The paper Ullman et al. (4) has 48 patient samples, and the publication Kim (5) contains 60 patient samples. The largest publication by number of samples is, which has a sample of 419 patient samples.

RESULTS

The article search process is carried out in stages as formulate the problem, search article. The search process focuses on several database papers using keywords as shown in table :

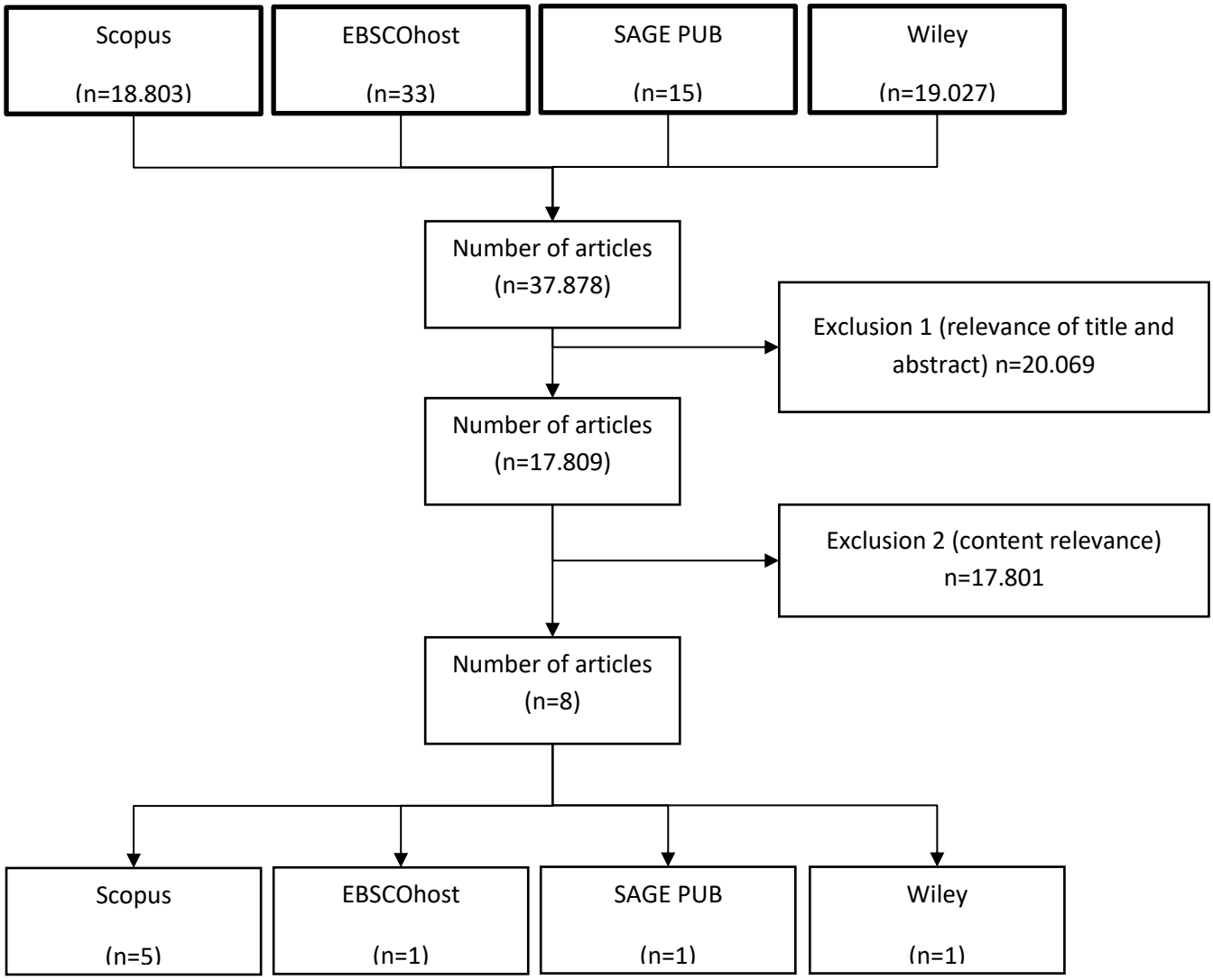
No	Database	Keyword
1	Scopus	*Medical Adhesive Related Skin Injury* AND Child
2	EBSCOhost	*Medical Adhesive Related Skin Injury* AND Child
3	SAGE	*Medical Adhesive Related Skin Injury* AND Child
4	Wiley	*Medical Adhesive Related Skin Injury* AND Child

After getting the articles, the next step is to evaluate. The stage is included in the critical appraisal analysis stage which is the core of literature review research. The results of the literature search and selection using the keywords in table :

https://doi.org/10.33755/jkk

p-ISSN : 2354 8428 | e-ISSN: 2598 8727

Jurnal Keperawatan Komprehensif
Vol. 8 Special Edition Juni 2022



The assessment of studies reveals that five of the eight articles suggest a link between the usage of medical adhesive and the occurrence of MARSI (6,7). According to the findings of Kim et al. (2019), the adhesive is the most commonly utilized tool for fixing the pipe endotracheal (13,2%) and fixing the face (40,3 percent). According to the findings of (7), skin injury is connected with the usage of a pipe endotracheal and the fixation of a pipe nasogasstrik. Novardian et al. observed similar results in (8), where transparent dressings applied to a baby's skin barrier were found to be efficient in reducing the occurrence of MARSI (pv <0,05). (4) and (9) found that using a gentle adhesive, such as a silicone ribbon and an electrode-supported hydrogel, or an adhesive incorporated, can successfully minimize MARSI on the newborn.

As for the 3 other articles showed that the female gender, age, duration of hospitalization, infection, edema, and surgical activity ; the age and hematological malignancy (10) ; and hormones, body mass index, duration of use, and chemotherapy cycles (11) are the factors associated with the incidence of MARSI (12)

https://doi.org/10.33755/jkk

p-ISSN : 2354 8428 | e-ISSN: 2598 8727

Jurnal Keperawatan Komprehensif
Vol. 8 Special Edition Juni 2022

Name (year)	Sample And Sampling Method	Method	Findings	Recommendations
(Kim, Jang, Kim, Heo, & Jeong, 2019)	From August 2 to October 25, 2017, 60 children were treated in the PICU 13 beds at a tertiary care hospital affiliated with the university in Yangsan (Korea southeast).	A prospective observational study was carried out. The characteristics of medical adhesive usage were investigated using descriptive statistics, and the MARSI incidence rate was estimated using three methods: (1) rate per 100 patients, (2) rate per 100 medical adhesive, and (3) level of medical adhesive use per 1000 days. The Chi-squared ($\chi 2$) test was used to analyze the data.	The most commonly utilized tool is adhesive for pipe endotracheal fixation (55/414) and tool fixation for the face (167/414).	Recommend using a medical adhesive with low adherence, such as silicone-based adhesives, and replacing the tape on a frequent basis to avoid MARSI.
(Wang et al., 2019)	For two weeks, researchers assessed all of the patients on a daily basis. The incidence of MARSI and the use of adhesive were both mentioned. Patients' clinical information was also gathered. Every day, the prevalence of MARSI is estimated, and the risk factors are statistically investigated.	The PICU children's hospital-based university in eastern China has used a cross-sectional design. There were 232 patients in total, with 611 people-days studied.	The female gender, age, period of hospitalization, infection, edema, and surgical activity are risk factors for the incidence of MARSI when employing the tool ribbon acrylate and the foundation fabric is elastic. In the case of tracheal intubation, it is one of the most prevalent triggers.	Reducing the prevalence of MARSI has the potential to improve patient care quality while also lowering costs and better allocating resources.
(Zhao et al., 2018)	One out of every 419 patients was	The empat department of hospitalisation inap undertook a cross-	Age and hematological malignancy are	MARSI is a highly significant and

https://doi.org/10.33755/jkk

p-ISSN : 2354 8428 | e-ISSN: 2598 8727

Jurnal Keperawatan Komprehensif
Vol. 8 Special Edition Juni 2022

	diagnosed. MARSI is present in 125 (29.83%) of PICC's sculptures, with mechanical skin injury (73, 17.42%), dermatitis (CD) (39, 9.31%), associated skin damages for women (11, 2.63%), and folikulitis (11, 2.63%) being the most common (2, 0.48 percent).	sectional observational study on Sunday. Skin-deep investigation THE PICC championship provided data and skin photographs.	two more characteristics linked to MARSI's keepers.	clinical researcher who should be avoided initially.
(Habiballah, 2017)	A total of 169 neonates were assessed for skin injuries caused by equipment adhesive.	Study cross-sectional	The use of a pipe endotracheal and the fixation of the pipe nasogasstrik resulted in skin damage.	Nurses will be able to identify infants who are most prone to develop skin injury and provide early treatment to avert problems.
(Tian et al, 2021)	A review of the 202 cancer patients who had treatment at our institution between February 2014 and July 2019. PICC has been linked to 50 occurrences of skin injury and 152 cases of non-skin harm.	The researchers utilized multivariate logistic regression to find independent risk factors for skin deterioration associated to the PICC, including cancer patients with skin damage from the catheter and patients without skin damage.	Hormone, BMI, time of use, and chemotherapy cycles are all factors that influence the impact of PICC-related skin damage.	We must first check the condition of the skin during the catheter installation in cancer patients who have used hormones repeatedly, have an elevated BMI, or are undergoing chemotherapy. To limit the risk of skin injury, use gauze pads as

p-ISSN : 2354 8428 | e-ISSN: 2598 8727

Jurnal Keperawatan Komprehensif
Vol. 8 Special Edition Juni 2022

				soon as possible when a rash appears and avoid contact with bandages-based adhesive.
(Marcatto et al., 2021)	Follow-up on all premature neonates (gestational age 28 to 37 weeks) admitted to the neonatal critical care unit. The Neonatal Skin Condition Scale is used to examine the condition of infants' skin (NSCS).	A total of 112 participants were enrolled in this prospective cohort research.	Soft adhesives, such as silicone bands and electrode-supported hydrogel, can aid in the reduction of MARSI in premature babies.	he use of adhesive tape on a prematurely delivered newborn should be regarded a risk factor for damage.
(Ullman et al., 2017)	Pediatric terpasanc CVCs were implanted consecutively in 48 individuals.	In two big hospitals, a four-group randomized controlled trial of conventional care (bandage polyurethane borders and seams) was done, compared to sanitary safety integrated, the device of fastening without seams, and tissue adhesive.	The satisfaction of the highest level of use is a swath of safety that has been integrated (average score of 8.5 out of 10; SD 1,2)	More research is needed to determine the effectiveness of the novel sanitary pads and product safety for CVADs in children.
(Novardian, Sulaeman, Purwati, & Sari, 2020)	A total of 80 babies were given the infusion, with 40 being under the age of 35 weeks and 40 being over the age of 34 weeks.	The pre-experimental research design is not the same without the control batch. Data was collected using NSCS (the scale of newborn skin condition) questionnaires with a score of 3-9. Wilcoxon test was used to analyze the data.	The application of transparent dressings on a baby's skin barrier is useful in reducing MARSI (pv <0,05).	It is recommended that transparent dressings be applied to the skin barrier to avoid the spread of MARSI.

p-ISSN : 2354 8428 | e-ISSN: 2598 8727

Jurnal Keperawatan Komprehensif
Vol. 8 Special Edition Juni 2022

DISCUSSION

MARSI (Medical Adhesive Related Skin Injury) is a dermatological disorder in which erythema or skin disorders, such as vesicles, bula, erosion, or rips, occur and last for 30 minutes or more after the adhesive is released (13). The term MARSI stands for "skin damage linked to medical adhesive," which is also known as "skin tears" or "skin injury." Assessment 30 minutes in the MARSI definition is part of the approval of the definition by a multidisciplinary committee, however monitoring in practice does not often take that long, and clinical assessment is stressed individually.

Based on the research journals that the researchers analyzed, the researchers determined that the journal was able to verify the existence of a medical adhesive that causes skin injury (MARSI) in pediatric patients treated in hospitals. On each shift, all participants were evaluated by a staff nurse, and the incidence of MARSI was confirmed by a wound care specialist. The characteristics of medical adhesive usage were investigated using descriptive statistics, and the MARSI incidence rate was estimated using three methods: (1) rate per 100 patients, (2) rate per 100 medical adhesive, and (3) level of medical adhesive use per 1000 days. The link between the MARSI and the gender, age group, and type of primary care was investigated using the Chi-squared ($\chi 2$) test (medical vs surgical). The overall number of medical adhesives utilized is 414, and the total amount of MA used is 1424,8. Fixation of the pipe endotracheal (55/414) and tool fixation for the face (167/414) are two of the most commonly utilized medical adhesives. The number of MARSI occurrences is 35 in 23 patients; exfoliation is the most prevalent manifestation of MARSI (26/35). When MARSI is suspected, a photo is taken and forwarded to a nurse specialized in wound care, who confirms the presence and kind of MARSI and informs the nurse in charge of the PICU. Even if the inflammation or degradation of the skin remains on some observations in the case of place the fixing of alternative note, the occurrence of MARSI in a specific location is counted as a single event. However, the discovery of MARSI in many locations is considered a new phenomenon. MARSI can occur in any population or clinical situation, but it is more common in children in intensive care units, who are frequently exposed to medical adhesive. As a result of the disruption of the skin barrier, prolonged hospitalization, harm to the therapeutic environment, increased medical costs, and poor quality of life, MARSI can cause pain and infection. Children who are critically unwell are particularly sensitive to skin damage. 9 The prevalence of MARSI was found to be 37,15 percent in this study, which was greater than the prevalence of MARSI in adult patients in acute care (13,0 percent) and in intensive care units (ICU) (13,0 percent) (31 percent) (14). The prevalence of MARSI was found to be substantially greater in this study when compared to ICU neonatals (26,6%). (7). Although neonates' skin is thinner and their skin barrier does not function as well as adults', they are more vulnerable (Lund, 2014). Providers that are aware of this can give better care, product selection, and application of various adhesives, as well as greater skin protection in general (14)

CONCLUSION

The use of adhesive is useful in reducing the occurrence of MARSI in infant patients, according to the findings of the literature study. In addition, there are various other factors that influence the risk of MARSI, including female gender, age, length of hospitalization, infection, edema, and surgical activity, hematological malignancy, hormone, BMI, duration of adhesive use, and chemotherapy cycle. Regular skin examinations and replacement of the medical adhesive, which is often but soft on children who are critically unwell, can be done as a kind of MARSI prevention intervention.

https://doi.org/10.33755/jkk

p-ISSN : 2354 8428 | e-ISSN: 2598 8727

Jurnal Keperawatan Komprehensif
Vol. 8 Special Edition Juni 2022

REFERENCES

1. Kudchadkar SR, Beers MC, Ascenzi JA, Jastaniah E, Punjabi NM. Nurses' Perceptions of Pediatric Intensive Care Unit Environment and Work Experience After Transition to Single-Patient Rooms. Am J Crit care an Off Publ Am Assoc Crit Nurses. 2016 Sep;25(5):e98–107.
2. Edsberg LE, Black JM, Goldberg M, McNichol L, Moore L, Sieggreen M. Revised National Pressure Ulcer Advisory Panel Pressure Injury Staging System: Revised Pressure Injury Staging System. J wound, ostomy, Cont Nurs Off Publ Wound, Ostomy Cont Nurses Soc. 2016;43(6):585–97.
3. Tremblay MS, LeBlanc AG, Kho ME, Saunders TJ, Larouche R, Colley RC, et al. Systematic review of sedentary behaviour and health indicators in school-aged children and youth. Int J Behav Nutr Phys Act. 2011 Sep;8:98.
4. Ullman AJ, Kleidon T, Gibson V, McBride CA, Mihala G, Cooke M, et al. Innovative dressing and securement of tunneled central venous access devices in pediatrics: a pilot randomized controlled trial. BMC Cancer. 2017 Aug;17(1):595.
5. Kim YJ, Radloff JC, Crane PA, Bolin LP. Rehabilitation intervention for individuals with heart failure and fatigue to reduce fatigue impact: A feasibility study. Ann Rehabil Med. 2019;43(6):686–99.
6. Razmus I. Factors Associated With Pediatric Hospital-Acquired Pressure Injuries. J wound, ostomy, Cont Nurs Off Publ Wound, Ostomy Cont Nurses Soc. 2018;45(2):107–16.
7. Habiballah L. Prevalence of neonate adhesive skin injuries in a Jordanian intensive care unit. Nurs Child Young People. 2017 Dec;29(10):42–6.
8. Novardian ., Sulaeman S, Purwati NH, Sari W. The Effectiveness of Skin Barrier on Medical Adhesive Related Skin Injury in Neonates at Perinatology Dr. Cipto Mangunkusumo Hospital Jakarta. 2020;(Icinna 2018):187–92.
9. de Oliveira Marcatto J, Santos AS, Oliveira AJF, Costa ACL, Regne GRS, da Trindade RE, et al. Medical adhesive-related skin injuries in the neonatology department of a teaching hospital. Nurs Crit Care. 2021 Mar;
10. McManus RJ, Mant J, Franssen M, Nickless A, Schwartz C, Hodgkinson J, et al. Efficacy of self-monitored blood pressure, with or without telemonitoring, for titration of antihypertensive medication (TASMINH4): an unmasked randomised controlled trial. Lancet. 2018;391(10124):949–59.
11. Tian L, Yin X, Zhu Y, Zhang X, Zhang C. Analysis of Factors Causing Skin Damage in the Application of Peripherally Inserted Central Catheter in Cancer Patients. J Oncol. 2021;2021:6628473.
12. Yates S, McNichol L, Heinecke SB, Gray M. Embracing the Concept, Defining the Practice, and Changing the Outcome: Setting the Standard for Medical Adhesive-Related Skin Injury Interventions in WOC Nursing Practice. J wound, ostomy, Cont Nurs Off Publ Wound, Ostomy Cont Nurses Soc. 2017;44(1):13–7.
13. McNichol L, Lund C, Rosen T, Gray M. Medical adhesives and patient safety: state of the science: consensus statements for the assessment, prevention, and treatment of adhesive-related skin injuries. J wound, ostomy, Cont Nurs Off Publ Wound, Ostomy Cont Nurses Soc. 2013;40(4):362–5.
14. Farris MK, Petty M, Hamilton J, Walters S-A, Flynn MA. Medical Adhesive-Related Skin Injury Prevalence Among Adult Acute Care Patients: A Single-Center Observational Study. J wound, ostomy, Cont Nurs Off Publ Wound, Ostomy Cont Nurses Soc. 2015;42(6):589–98.

https://doi.org/10.33755/jkk