



Normal Saline versus Baby Shampoo in the Care of Peristomal Skin Complications in Pediatric Stoma Patients: A Randomized Controlled Trial

Pediyatrik Stoma Hastalarında Peristomal Cilt Komplikasyonlarının Bakımında Normal Salin ile Bebek Şampuanının Karşılaştırılması: Randomize Kontrollü Bir Çalışma

Esra Ardahan Akgül¹, İlknur Mert², Türkan Buğdaycı², Akgün Oral³, Hatice Yıldırım Sarı¹

¹İzmir Katip Çelebi University Faculty of Health Sciences, Department of Pediatric Nursing, İzmir, Türkiye

²University of Health Sciences Türkiye, İzmir Faculty of Medicine, Dr. Behçet Uz Pediatric Diseases and Surgery Training and Research Hospital, Ostomy and Wound Care Unit, İzmir, Türkiye

³University of Health Sciences Türkiye, İzmir Faculty of Medicine; İzmir City Hospital, Department of Pediatric Surgery, İzmir, Türkiye

ABSTRACT

Objective: Complications such as irritant dermatitis, infection, hypergranulation tissue should not occur involving the peristomal area to maintain skin integrity. Correct stoma creation techniques and appropriate nursing care are essential to prevent complications. This study aimed to compare the effectiveness of two different skin care solutions on peristomal skin integrity.

Method: Twenty-six children with an ostomy hospitalized in the pediatric surgery intensive care unit were randomized. Stoma care of the children was performed using saline solution in Group 1, and distilled water + pH 5.5 baby shampoo in the standard care group for 7 days. On the 3rd and 7th days of the study, the peristomal skin integrity of the patients was evaluated using the peristomal integrity follow-up form and the Pittman ostomy complication severity index. The CONSORT checklist was used for the study.

Results: Concerning the measurements made on the 3rd and 7th day of the study, there was no difference between both groups in terms of peristomal temperature or Pittman ostomy complication severity index scores, but skin moistures measured on the 7th day differed ($p=0.01$).

Conclusion: The findings suggest that the use of distilled water + pH 5.5 baby shampoo as part of peristomal skin care may help maintain better skin moisture by the 7th day compared to saline solution, although no significant differences were observed between both groups in terms of skin temperature or complication severity.

Keywords: Ostomy, peristomal skin integrity, pediatric surgery, nursing

ÖZ

Amaç: Cilt bütünlüğünü korumak için peristomal bölgede tahriş edici dermatit, enfeksiyon, hipergranülasyon dokusu gibi komplikasyonlar meydana gelmemelidir. Komplikasyonları önlemek için doğru stoma açma teknikleri ve uygun hemşirelik bakımı çok önemlidir. Bu çalışma, iki farklı cilt bakım solüsyonunun peristomal cilt bütünlüğü üzerindeki etkilerini karşılaştırmayı amaçlamıştır.

Yöntem: Pediyatrik cerrahi yoğun bakım ünitesinde yatmakta olan ostomili 26 çocuk randomize edilmiştir. Çocukların stoma bakımı 7 gün boyunca, bir grupta salin ile, diğer grupta ise distile su + pH 5,5 bebek şampuanı ile gerçekleştirildi. Çalışmanın 3. ve 7. günlerinde, hastaların peristomal cilt bütünlüğü peristomal bütünlük takip formu ve Pittman ostomi komplikasyon şiddet endeksi ile değerlendirildi. Çalışma için CONSORT kontrol listesi kullanıldı.

Bulgular: Üçüncü ve 7. günlerde yapılan ölçümlerde, peristomal sıcaklık veya Pittman ostomi komplikasyon şiddet endeksi puanı açısından fark yoktu, ancak 7. günde cilt neminde fark vardı ($p=0,01$).

Sonuç: Bulgular, peristomal cilt bakımı kapsamında damıtılmış su + pH 5,5 bebek şampuanı kullanımının, cilt sıcaklığı veya komplikasyon şiddeti açısından anlamlı bir fark gözlemlenmemesine rağmen, 7. günde salin ile karşılaştırıldığında daha iyi cilt neminin korunmasına yardımcı olabileceğini göstermektedir.

Anahtar kelimeler: Stoma, peristomal cilt bütünlüğü, pediyatrik cerrahi, hemşirelik

Received: 29.01.2026

Accepted: 06.04.2026

Publication Date: 21.08.2026

Corresponding Author

Esra Ardahan Akgül,

İzmir Katip Çelebi University Faculty of Health Sciences, Department of Pediatric Nursing, İzmir, Türkiye

E-mail: esra.ardahan@ikcu.edu.tr

ORCID: 0000-0003-3124-567

Cite as: Ardahan Akgül E, Mert İ, Buğdaycı T, Oral A, Yıldırım Sarı H. Normal saline versus baby shampoo in the care of peristomal skin complications in pediatric stoma patients: a randomized controlled trial. J Dr Behcet Uz Child Hosp. 2026;16(2):83-90



INTRODUCTION

A stoma refers to the surgical opening of a section of the intestine—either a loop or separate proximal and distal segments—onto the abdominal wall skin. It may be created in patients with congenital anomalies such as anorectal malformation, Hirschsprung's disease, intestinal atresia, trauma, or perineal burns⁽¹⁾. Stoma-related complications such as prolapse, stenosis, retraction, or parastomal hernia may occur, in addition to systemic complications like fluid-electrolyte imbalance and vitamin B12 deficiency⁽²⁾.

Peristomal complications are localized skin problems around the stoma site including irritant dermatitis, infections, hypergranulation tissue, bleeding, or necrosis, most of which result from continuous exposure to stoma effluents⁽²⁾. Although many peristomal complications are reported to develop after the first postoperative week, early skin changes such as irritant dermatitis, erythema, and moisture imbalance may become manifest within the first days following stoma creation. These early alterations are clinically important, as they may progress into more severe complications if not properly managed. Therefore, close monitoring and appropriate skin care interventions during the first postoperative week are critical for preventing long-term peristomal skin damage.

According to the Wound, Ostomy, and Continence Nurses Society, a healthy peristomal skin is defined as "an area which is intact, similar in color and texture to adjacent skin, free of inflammation, and without manifesting altered sensitivity such as itching, burning, or pain"⁽³⁾. To achieve this goal, comprehensive nursing assessment and the use of appropriate cleansing solutions are essential. Skin moisture and temperature are important indicators of peristomal skin integrity. Increased moisture may lead to maceration of the peristomal skin and facilitate skin breakdown, while changes in skin temperature may reflect inflammation or impaired perfusion. Therefore, maintaining optimal moisture balance and stable skin temperature is essential in preventing peristomal complications.

Different cleansing solutions have been used in stoma care, such as distilled water, saline solution, mild pH-balanced baby shampoos, or (historically) antiseptic solutions⁽⁴⁻⁶⁾. Saline solution is widely used due to its isotonic nature, which preserves tissue integrity without disrupting the skin barrier. It has been shown to support skin hydration without causing irritation^(7,8). Therefore, it was selected as a comparator in this study. Baby shampoo,

although not routinely recommended, continues to be used in some clinics as part of "standard care" because of its mild pH and cleansing properties^(9,10). Given that our institution still applies baby shampoo in routine stoma care, this study aimed to compare its effects with those of saline solution in maintaining peristomal skin integrity in children.

MATERIALS and METHODS

This study aimed to compare the effect of two different solutions used in stoma care on peristomal skin integrity.

The hypotheses of this study are as follows:

H1-1: Children who receive skin care with saline solution experience fewer ostomy-related complications compared to those who receive care with distilled water + pH 5.5 baby shampoo.

H1-2: Children who receive skin care with saline solution have lower peristomal skin temperature compared to those who receive care with distilled water + pH 5.5 baby shampoo.

H1-3: Children who receive skin care with saline solution have higher peristomal skin moisturization compared to those who receive care with distilled water + pH 5.5 baby shampoo.

Study Design

This study was a prospective randomized controlled trial conducted between November 2023 and November 2024 in the pediatric surgery intensive care unit of a tertiary hospital (Figure 1). The study was registered at the U.S. National Library of Medicine Clinical Trials (NCT05686902, registration date: 06.01.2023).

Participants

Children with (a) a newly created stoma, (b) available parental informed consent (c) and follow-up data encompassing at least 7 days postoperatively (d) but without underlying conditions affecting peristomal skin integrity (e.g., obesity, malnutrition, corticosteroid therapy, atopic dermatitis, psoriasis)⁽¹¹⁾ were included in the study. Exclusion criteria were: (a) allergy to cleansing solutions, (b) early stoma closure within 7 days, (c) parental withdrawal of consent, or (d) need to switch cleansing solution during the study.

Randomization and Allocation

After obtaining baseline data on postoperative day 0, participants were randomized into two groups (n=13):

Standard Care Group: Whose peristomal skin was cleansed with distilled water + pH 5.5 baby shampoo (routine clinical practice in this unit).

Saline Group: Whose peristomal skin was cleansed with 0.9% normal saline solution.

Randomization was performed by Researcher-1 using simple random sampling via a web-based tool (www.random.org). Each eligible participant was assigned a unique number and allocated accordingly. Due to the nature of the intervention, the caregiver nurse (Researcher-2) could not be blinded to allocation of the groups. However, both the outcome assessor (Researcher-3) and data analyst (Researcher-4) were blinded to group allocation to minimize assessment and analysis bias.

Intervention Protocols

All stoma care was performed once daily using the assigned cleansing solution. The pouching system was replaced daily by Researcher-2. Other aspects of nursing care continued according to routine clinical protocols.

The cleansing procedure was standardized for all participants. The peristomal area was cleaned once daily using sterile gauze soaked with the assigned solution. Approximately 10 mL of solution was used for each application. The solution was applied gently without friction, allowed to remain in contact with the skin for approximately 10 seconds, and then (if applicable) rinsed with distilled water. The cleansed area was subsequently dried using sterile gauze by gentle patting. Care was taken to ensure complete dryness before applying the pouching system.

Outcomes

The primary outcome of this study was the early postoperative complications, assessed using the Pittman ostomy complication severity index.

The secondary outcomes were peristomal skin temperature measured with a routinely calibrated infrared thermometer and peristomal skin moisture on day 7, measured with the OEM SK-8 Digital Skin Moisture Analyzer.

Sample Size and Power Analysis

Sample size was calculated using G*Power 3.1.9.2.⁽¹²⁾ Assuming a medium effect size ($d=0.50$), $\alpha=0.05$, and 80% power for detecting a difference in the primary outcome (skin moisture at day 7), assessment of a minimum of 13 participants per group (total $n=26$) was required.

Data Collection Tools

Demographic data form was used to collect information on age, sex, and medical diagnosis of the children.

Peristomal skin integrity follow-up form was used to collect information on skin moisture and temperature on days 0, 3, and 7. Skin moisture was measured using the Digital Skin Moisture Analyzer (OEM SK-8), which provides percentage-based hydration values. The device was calibrated according to the manufacturer's instructions before each measurement session. Skin temperature was measured using a non-contact (Wohler) infrared thermometer, routinely calibrated by the biomedical unit of the hospital.

Pittman Ostomy Complication Severity Index⁽¹³⁾

This scale is a 9-item assessment tool developed by Joyce Pittman in 2014, with its Turkish validity and reliability established by Arslantaş et al.⁽¹⁴⁾ The purpose of using this scale was to assess the frequency and severity of early-stage postoperative complications in individuals with stomas during follow-up. This index assesses leakage, peristomal irritant dermatitis, pain, bleeding within or around the stoma, stoma necrosis, stenosis, retraction, mucocutaneous separation, and hyperplasia. All complications are scored on a Likert-like scale ranging from 0 to 3 (0=none, 1=mild, 2=moderate, 3=severe). The total score ranges from 0 to 27 points. Higher scores indicate more severe ostomy complications. The content validity index score of the scale is 0.971.

Statistical Analysis

Data were analyzed using SPSS 26.0. Descriptive statistics were presented as means $\pm$ standard deviation or percentages. The Kolmogorov-Smirnov test was used to assess normality of data distribution⁽¹⁵⁾. Independent Student's t-test or Mann-Whitney U test was applied for continuous variables, and chi-square test for categorical variables. Analysis of Covariance (ANCOVA) was performed to adjust for confounders (age, sex, diagnosis, stoma type). The level of statistical significance was set at $p \leq 0.05$.

Ethical Statement

The research protocol was approved by the Clinical Research Ethics Committee of the University of Health Sciences Türkiye, İzmir Faculty of Medicine, Dr. Behçet Uz Pediatric Diseases and Surgery Training and Research Hospital (IRB no: 2022121-05, date: 08.12.2022). The researcher informed the children's parents about the purpose of the study, and written informed consent forms

were obtained from the parents who agreed to participate in the study.

RESULTS

Demographics

The participants' median age was 19.5 days, and 53.8% were female. The most common indication for creation of a stoma was Hirschsprung's disease (38.5%), and 73.1% of the patients had a colostomy. There were no significant baseline differences between the groups regarding age ($p=0.41$), gender ($p=0.61$), diagnosis ($p=0.69$), or type of stoma ($p=0.19$) (Table 1).

Primary Outcome

Peristomal Complications (Pittman Ostomy Complication Severity Index)

At baseline, all children had a Pittman Index score of 0. On day 3, scores were slightly higher in the saline group, while on day 7, scores were higher in the baby shampoo group. However, these differences were not statistically significant (day 3: $p=0.65$, day 7: $p=0.09$).

Importantly, most often peristomal complications (dermatitis, irritant redness, minor bleeding at the skin edge) were recorded. No major stoma-related complications (e.g., necrosis due to vascular insufficiency, retraction, prolapse) were observed during the 7-day follow-up period (Table 2).

Table 1. Comparison of the demographic data between the groups (n=26)

	Saline group		Baby shampoo group		Statistical analysis
Children's age (day)	Median: 21.00 Mode: 2.00*		Median: 17.00 Mode: 4.00		$p=0.41$ U=68.500
Gender	n	%	n	%	
Girl	8	61.5	6	46.2	$p=0.61$ chi-square=0.431
Boy	5	38.5	7	53.8	
Medical diagnosis					
Hirschsprung's disease	6	46.2	4	30.8	$p=0.69$ chi-square=0.708
Anorectal malformation	5	38.5	6	46.2	
Necrotizing enterocolitis	2	15.4	3	23.1	
Type of stoma					
Ileostomy	3	23.1	4	30.8	$p=0.19$ chi-square=0.658
Colostomy	10	76.9	9	69.2	

*Multiple modes exist. The smallest value is shown

Table 2. Comparison of the mean scores between the groups (n=26)

	Saline group	Ph 5.5 baby shampoo group	p*
Skin moisture			
Baseline	46.00±4.58	43.76±3.98	0.22
3 rd day	42.07±7.07	36.69±5.93	0.057
7 th day	43.62±4.20	38.70±5.18	0.01
Skin temperature			
Baseline	30.96±3.32	30.62±3.09	0.80
3 rd day	32.15±3.68	31.19±3.33	0.51
7 th day	32.27±2.09	31.83±2.44	0.65
Pittman ostomy complication severity index score			
Baseline	0.00±0.00	0.00±0.00	1.000
3 rd day	4.61±2.69	4.07±2.84	0.65
7 th day	5.30±2.83	7.61±3.64	0.09

*Mann Whitney U test

Secondary Outcomes

Peristomal Skin Temperature

Baseline skin temperatures were similar across groups. On days 3 and 7, the baby shampoo group had slightly lower skin temperatures, but the differences regarding peristomal skin temperatures between both groups were not statistically significant ($p=0.51$ and $p=0.65$, respectively).

Peristomal Skin Moisture

At baseline, there was no significant difference between groups in terms of peristomal skin moisture. On day 3, the saline group showed higher mean skin moisture compared to the baby shampoo group, but this intergroup difference did not reach statistical significance ($p=0.057$). On day 7, the intergroup difference became significant, with higher moisture levels in the saline group ($p=0.01$) (Table 2).

After adjustment for age, sex, diagnosis, and stoma type using ANCOVA, the saline group maintained significantly higher skin moisture at day 7 (mean difference =5.048, standard error =2.057, $p=0.02$) (Table 3, Figure 2).

Clinical Significance

Since there is no established clinically important and minimum difference in the literature regarding peristomal skin integrity in children using either of the stoma cleansing solutions, clinical significance was based on the premise that a post hoc effect size exceeding the a priori effect size is considered clinically significant—a method also cited in the literature⁽¹⁶⁾. Accordingly, in this study, a post-hoc power analysis confirmed that the achieved effect size (1.04) and power (0.81) exceeded the planned thresholds (0.50 and 0.80, respectively), supporting the clinical relevance of the observed difference in skin moisture. Since the achieved effect size and power of the study are greater than the priori effect size (0.50) and power (0.80) the finding was considered to be clinically significant.

DISCUSSION

We conducted this randomized controlled study to compare the effect of saline solution versus pH 5.5 baby shampoo on peristomal skin integrity in children with newly created stomas.

Our results showed that there were no significant differences in skin temperature or complication severity scores between both groups. In our study, no significant difference was found in peristomal skin temperature between groups which may indicate that both cleansing solutions are similarly effective in preventing inflammation in the early postoperative period. Also, no significant intergroup difference was observed in Pittman index scores. In contrast to our findings, Kulawik-Pióro's study concluded that the use of shampoo-like products could damage the lipids and proteins in the stratum corneum layer of the skin around the stoma, thereby increasing the risk of complications⁽¹⁷⁾. Consistent with our results, D' Ambrosio's study also concluded that peristomal skin complications were less common in the early postoperative period⁽¹⁸⁾. This finding may be explained by the short follow-up period and the low incidence of serious complications in the early phase which suggests that, although both solutions are used in clinical practice, the saline solution may be more effective in maintaining skin moisture—a critical factor in preventing long-term peristomal damage.

Our results showed that skin moisture was significantly higher in the saline group by day 7. Pars and Çavuşoğlu⁽¹⁹⁾ compared saline solution with, pH 5.5 baby soap, and hydrogel, reporting that skin moisturization was higher in the saline group. Although hydrogel was included in that study, current evidence does not support hydrogel for routine peristomal skin care, as it is primarily indicated for wound management rather than preventive stoma care. Salami et al.⁽²⁰⁾ compared chlorhexidine, saline solution, and tap water in wound healing, showing that saline solution maintained better skin hydration. Although chlorhexidine has been evaluated for its use as a stoma cleansing agent, guidelines advise against its

Table 3. Evaluation of factors affecting skin moisture at 7th postoperative day

Covariance analysis						
Groups		Mean difference	SE	p	95% CI for Exp(β)	
					Lower	Upper
Saline	Baby shampoo	5.048	2.057	0.02	0.757	9.339
Variances included in the model: group, gender, ostomy type, medical diagnosis, age SE: Standard error, CI: Confidence interval						

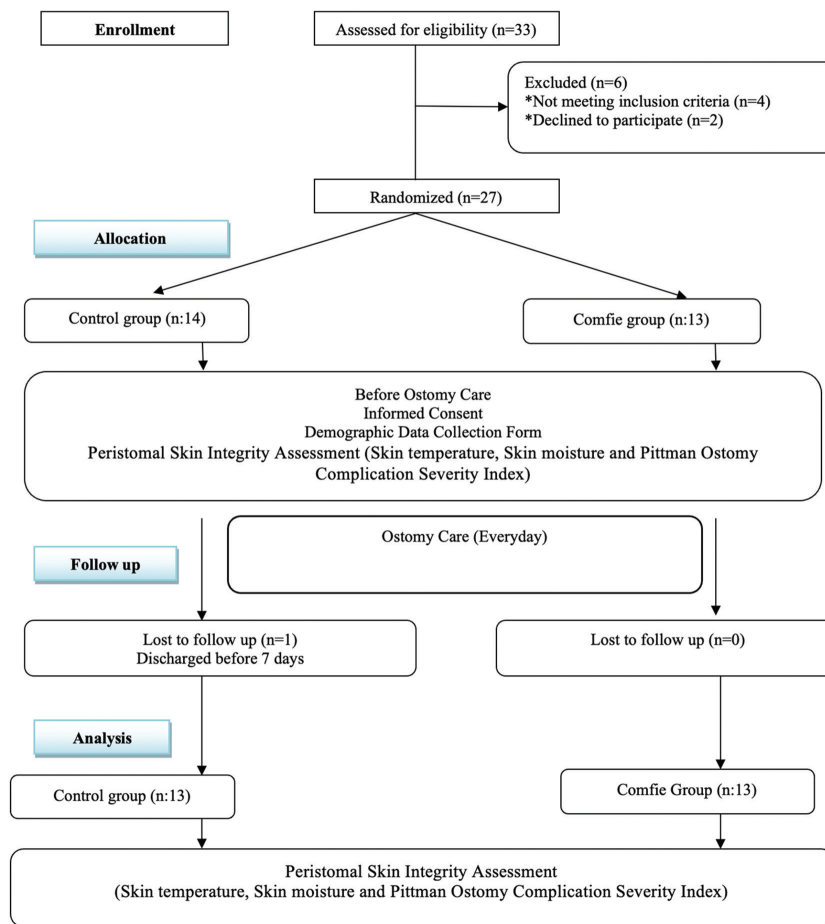


Figure 1. Research process flow chart

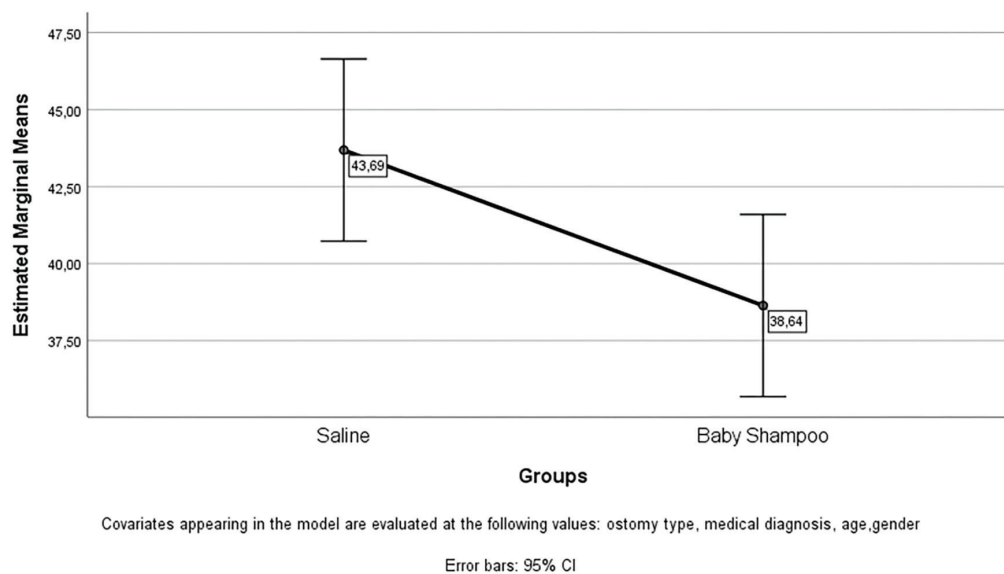


Figure 2. Estimated marginal means of 7th day skin moisture

CI: Confidence interval

use on peristomal skin due to irritation risk. Karaca and Korkmaz⁽²¹⁾ found that saline solution was more effective in maintaining peristomal skin moisture and temperature compared with barrier cream. Similarly, barrier creams are not routinely recommended for peristomal skin, except in special circumstances of significant irritation

Baby cleansers with pH 5.5 are formulated to be mild and support physiological skin balance⁽²²⁾. However, randomized studies on newborn skin care have demonstrated that soaps and shampoos can increase transepidermal water loss and alter skin pH⁽²³⁾. This finding may explain why the baby shampoo group in our study had lower skin moisture by day 7. Although saline solution is widely recommended, some studies suggest that mild cleansers may improve skin comfort and provide cleansing efficiency without damaging the skin barrier⁽⁹⁾. Additionally, a study by Qin et al.⁽²⁴⁾ suggests that warm water is the most appropriate cleansing product. However, inconsistent findings in the literature highlight the need for further conduction of high-quality randomized studies.

Clinical Implications

Making distinction between peristomal complications (e.g., irritant dermatitis, minor bleeding, redness) and stoma-related complications (e.g., necrosis due to ischemia, retraction, prolapse) is essential for guiding both research and clinical practice. In our study, only peristomal complications were observed within the 7-day follow-up, reinforcing the need to focus on appropriate cleansing methods as preventive measures.

Strengths and Limitations

Its randomized design, the use of validated assessment tools, and the blinding of both the outcome assessor and the data analyst can be assessed as the strengths of this study. Limitations include the small sample size, and the short 7-day follow-up period. The study is planned to be repeated by measuring skin pH, and using different solutions in a larger sample size.

CONCLUSION

For nurses and caregivers, these findings are clinically meaningful. Saline is widely available cost-effective solution, and its relevant use is supported by guidelines. In contrast, baby shampoo continues to be used in some clinics despite limited supporting evidence. Our study contributes to clarifying this practice gap and may support the standardization of pediatric stoma care protocols.

Ethics

Ethics Committee Approval: The research protocol was approved by the Clinical Research Ethics Committee of the University of Health Sciences Türkiye, İzmir Faculty of Medicine, Dr. Behçet Uz Pediatric Diseases and Surgery Training and Research Hospital (IRB no: 2022121-05, date: 08.12.2022).

Informed Consent: The researcher informed the children's parents about the purpose of the study, and written informed consent forms were obtained from the parents who agreed to participate in the study.

Declaration of AI Use: No artificial intelligence tools were used in the preparation of this manuscript.

Footnotes

This study was presented as a pilot study poster presentation at the 9th European Academy of Pediatric Societies held in Vienna, Austria, on October 17-20, 2024.

Author Contributions

Surgical and Medical Practices: A.O., Concept: E.A.A., H.Y.S., Design: E.A.A., H.Y.S., İ.M., T.B., Data Collection or Processing: İ.M., T.B., Analysis or Interpretation: E.A.A., Literature Search: E.A.A., H.Y.S., Writing: E.A.A., H.Y.S.

Conflict of Interest: The authors have no conflict of interest to declare.

Financial Disclosure: This study was supported by the Scientific Research Coordination Office of İzmir Katip Çelebi University as part of the Career Support Project (number: 2023-KDP-SABT-0001).

REFERENCES

1. Goret NE, Goret CC, Cetin K, Agachan AF. Evaluation of risk factors for complications after colostomy closure. *Ann Ital Chir.* 2019;90:324-29.
2. Liechty ST, Barnhart DC, Huber JT, Zobell S, Rollins MD. The morbidity of a divided stoma compared to a loop colostomy in patients with anorectal malformation. *J Pediatr Surg.* 2016;51(1):107-10. doi: 10.1016/j.jpedsurg.2015.10.025
3. Ratliff CR, Goldberg M, Jaszarowski K, McNichol L, Pittman J, Gray M. Peristomal Skin Health: A WOCN Society Consensus Conference. *J Wound Ostomy Continence Nurs.* 2021;48(3):219-31. doi: 10.1097/WON.0000000000000758
4. Abd-Elhay HA, Osman MA, Gadallah MA, Sayed EH. Post-operative peristomal skin complications in children with colostomy. *Assiut Scientific Nursing Journal.* 2019;7(19):156-62.
5. Salvadalena G, Colwell JC, Skountrianos G, Pittman J. Lessons learned about peristomal skin complications: secondary analysis

- of the ADVOCATE Trial. *J Wound Ostomy Continence Nurs.* 2020;47(4):357-63. doi: 10.1097/WON.0000000000000666.
6. Konya I, Nishiya K, Yano R. Effectiveness of bed bath methods for skin integrity, skin cleanliness and comfort enhancement in adults: a systematic review. *Nurs Open.* 2021;8(5):2284-300. doi: 10.1002/nop2.836.
7. Chang R, Holcomb JB. Choice of fluid therapy in the initial management of sepsis, severe sepsis, and septic shock. *Shock.* 2016;46(1):17-26. doi: 10.1097/SHK.0000000000000577.
8. El-Amawy HS, Sarsik SM. Saline in dermatology: a literature review. *J Cosmet Dermatol.* 2021;20(7):2040-51. doi: 10.1111/jocd.13813.
9. Voegeli D. The effect of washing and drying practices on skin barrier function. *J Wound Ostomy Continence Nurs.* 2008;35(1):84-90. doi: 10.1097/01.WON.0000308623.68582.d7.
10. Carbonell BB, Treter C, Staccini G, MajnoHurst P, Christoforidis D. Early peristomal complications: detailed analysis, classification and predictive risk factors. *Ann Ital Chir.* 2020;91:69-73.
11. Tsujinaka S, Tan KY, Miyakura Y, Fukano R, Oshima M, Konishi F, et al. Current management of intestinal stomas and their complications. *J Anus Rectum Colon.* 2020;4(1):25-33. doi: 10.23922/jarc.2019-032.
12. Cohen J. Statistical power analysis for the behavioral sciences—second edition. 12 Lawrence Erlbaum Associates Inc. Hillsdale, New Jersey. 1988;13.
13. Pittman J, Bakas T, Ellett M, Sloan R, Rawl SM. Psychometric evaluation of the ostomy complication severity index. *J Wound Ostomy Continence Nurs.* 2014;41(2):147-57. doi: 10.1097/WON.0000000000000008
14. Arslantaş AU, Karahan E, Büyükuysal MÇ. Validity and reliability of the Turkish version of Pittman ostomy complication severity index. *Turk J of Colorectal Dis.* 2020;30(1):27-36. doi: 10.4274/tjcd.galenos.2019.2019-9-5.
15. Razali NM, Wah YB. Power comparisons of Shapiro-Wilk, Kolmogorov-Smirnov, lilliefors and anderson-darling tests. *Journal of Statistical Modeling and Analytics.* 2011;2(1):21-33.
16. Sainani KL. Clinical versus statistical significance. *PM R.* 2012;4(6):442-5. doi: 10.1016/j.pmrj.2012.04.014.
17. Kulawik-Pióro A, Miastkowska M, Bialik-Wąs K, Zelga P, Piotrowska A. Physicochemical properties and composition of peristomal skin care products: a narrative review. *Cosmetics.* 2025;12(2):74. <http://doi.org/10.3390/cosmetics12020074>.
18. D'Ambrosio F, Pappalardo C, Scardigno A, Maida A, Ricciardi R, Calabrò GE. Peristomal skin complications in ileostomy and colostomy patients: what we need to know from a public health perspective. *Int J Environ Res Public Health.* 2022;20(1):79. doi: 10.3390/ijerph20010079.
19. Pars H, Çavuşoğlu H. Effects of 3 different methods of care on the peristomal skin integrity of children with percutaneous endoscopic gastrostomy tubes: a prospective randomized controlled trial. *Adv Skin Wound Care.* 2018;31(4):172-81. doi: 10.1097/01.ASW.0000530683.93372.3a.
20. Salami AA, Imosemi IO, Owoeye OO, Salami A, Imosemi I, Owoeye O. A comparison of the effect of chlorhexidine, tap water and normal saline on healing wounds. *Int J Morphol.* 2006;24(4):673-6. doi: 10.4067/S0717-95022006000500025.
21. Karaca T, Korkmaz F. A quasi-experimental study to explore the effect of barrier cream on the peristomal skin of patients with a tracheostomy. *Ostomy Wound Manag.* 2018;64(3):32-9.
22. Mendes BR, Shimabukuro DM, Uber M, Abagge KT. Critical assessment of the pH of children's soap. *J Pediatr (Rio J).* 2016;92(3):290-5. doi: 10.1016/j.jped.2015.08.009.
23. Ramos MCM, Velasco MVR, Bueno M, Veríssimo MÓR. Effects of liquid and bar soaps on the skin of Brazilian newborns: a randomized controlled trial. *Skin Pharmacol Physiol.* 2023;36(6):267-77. doi: 10.1159/000536066.
24. Qin J, Han L, Lv G, You Y, Zhuang H, Ma L. Best evidence summary for self-management of peristomal skin complications in patients with colorectal cancer and a stoma. *Asia Pac J Oncol Nurs.* 2025;12:100822. doi: 10.1016/j.apjon.2025.100822.