Original article

Development of an incontinence-associated dermatitis prevention bundle using an evidence-based framework

ABSTRACT

Background Incontinence-associated dermatitis (IAD) is a prevalent cause of skin damage in the clinical setting. IAD may cause a heat sensation, pruritus, pain and infection as well as prolong hospital stays and increase healthcare costs.

Objective The aim of this study was to develop a bundle care guideline for IAD based on an evidence-based framework.

Method Three steps were conducted: an IAD bundle care guideline was drafted, consensus among hospital nursing staff and clinical experts was obtained, and an evaluation was made by methodology experts.

Results The initial guideline was approved by 30 nurses and seven clinical experts (two runs) to achieve >80% agreement. Three methodology experts evaluated the quality of the development process as a use recommendation. The IAD bundle care guideline consisted of four aspects with 19 interventions – skin assessment, skin cleansing, skin protection and supportive care. The IAD bundle care guideline was standardised and evidence-based.

Conclusions The developed IAD bundle care guideline integrates information from a systematic literature review and the opinions of nurses, clinical experts and methodology experts, and is recommended for clinical application. Further studies will be implemented to verify its effectiveness.

Keywords evidence-based framework, incontinence-associated dermatitis, bundle care

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INTRODUCTION

Incontinence-associated dermatitis (IAD) is a prevalent cause of skin damage in the clinical setting. IAD may cause a heat sensation, pruritus, pain and infection as well as prolong hospital stays and increase healthcare costs[1]. A cross-sectional study in Taiwan found that the prevalence of IAD is 26.3% and that a high proportion of cases occur during hospitalisation[2]. The incidence of acute nosocomial IAD in the USA is 45.7%, and IAD is associated with a significantly increased prevalence of sacral pressure injury[3]. Once IAD occurs, empirical care should be provided to shorten healing time and prevent the occurrence of complications[4]. The IAD assessment and standard care are inconsistent in the different organisations and need to be developed[5]. A systematic review of IAD care was conducted in the previous study[6]. The review consisted of four aspects of IAD prevention and treatment interventions – skin assessment, skin cleansing, skin protection and supportive care.

The Institute for Healthcare Improvement introduced the concept of bundle care to improve the quality of care[7]. In this study, the evidence-based approach was used as a guide to develop an IAD care bundle integrated with the four aspects of interventions. The approach included systematic review, clustering evidence-based interventions, and appraisal of clinical practices. Gray et al. recommend that implementation of standardised strategies would promote integration of IAD prevention and management into practice in order to prevent and treat IAD[8]. The intervention review showed that there was a lack of consistent and evidence-based IAD prevention and interventions[9] and that some trials mostly focused on skin care products and procedures[10]. Although a previous study included IAD assessment, prevention and management strategies[11], these lacked empirical IAD bundle care guidelines. Therefore, the aim of this study was to develop a bundle care guideline for IAD based on an evidence-based framework.

The trials included in this review tested skin care products, procedures and the frequencies of using a skin care product.

METHODS

In the systematic review, the databases included the Cumulative Index to Nursing and Allied Health Literature, PubMed, Cochrane Library, Joanna Briggs Institute, National Guideline Clearinghouse, and Best Practice Guidelines. Key words included incontinence-associated dermatitis or incontinence lesion and skin care and prevention and intervention. A total of 27 articles were extracted to evaluate the quality of evidence. The preliminary bundle care guidelines include four major aspects – skin assessment, skin cleansing, skin protection and supportive care – and, originally, 20 care activities[6].

First, the care guidelines were subjected to expert validity testing. The importance, applicability and text clarity of the guidelines were reviewed and scored by five wound and ostomy nurses using a 4-point Likert scale. Next, a content review of the care guidelines was performed by 30 clinical nurses with professional advanced level 2 and above, seven clinical experts and researchers, and three methodology experts (Figure 1).

Clinical nursing staff and clinical experts performed practical reviews and scored the care activities according to implementation feasibility and applicability. The scoring was from 4 (agree) to 1 (disagree) and 0 (not applicable). Concrete suggestions must be provided for 'disagree' and 'not applicable' items. The care activities must be achieved to an 80% approval rate. At the same time, three methodology experts reviewed the content according to the six quality domains of the Appraisal of Guidelines for Research & Evaluation (AGREE)[12] – scope and purpose, stakeholder involvement, developmental rigour, presentation clarity, applicability, and editorial independence – in order to assess the overall guidelines and to review the research quality and rigour of the IAD bundle care guidelines[12]. A percentage of the maximum possible score for each domain was computed. A domain score was calculated by summing up all the scores of the individual items in a domain.

RESULTS

The content validity index of the preliminary bundle care guidelines was ≥0.8. In the first round of the content

Figure 1. Flowchart of the development of the IAD bundle care guidelines

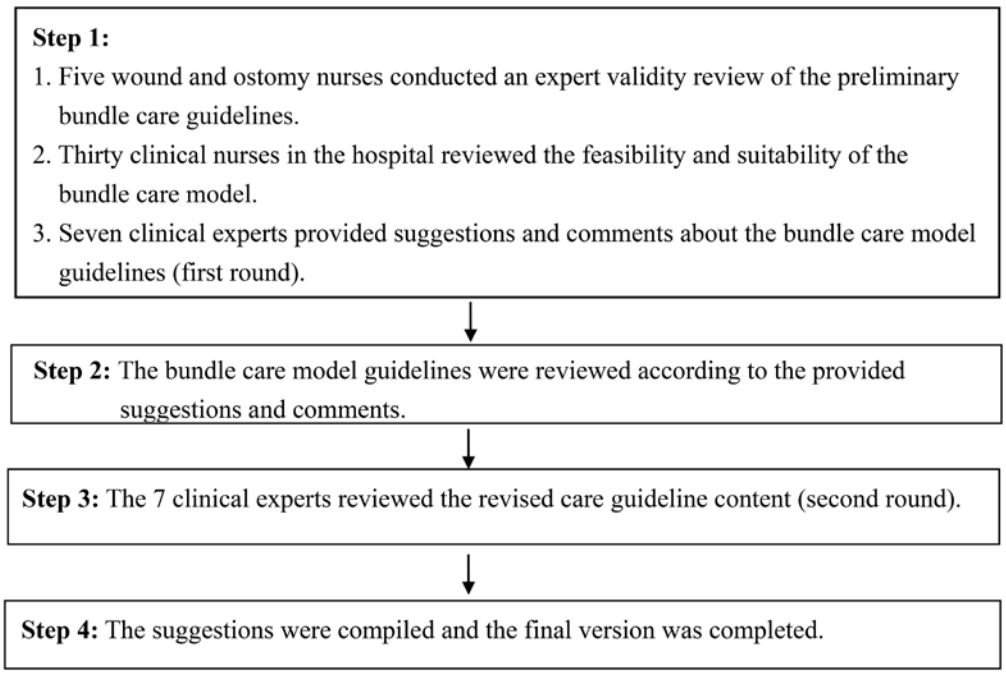

Table 1. Consensus results of the bundle care guidelines from seven clinical experts

Aspects	First round consensus / agreement level <80%	Second round consensus / agreement level ≥80%
Skin assessment	• Follow an IAD skin assessment tool to assess skin status in the perineal region (71%)	• Follow an assessment tool, the 2015 IAD Severity Categorisation Tool (86%)
Skin cleansing	• Clean the skin every 8 hours or after every bowel incontinence event (57%) • Do not overly cleanse the skin, as frequent cleaning will damage skin keratinocytes (71%)	• Clean the skin after defecation or urination or once a day if no bowel movement has occurred (100%) • Clean in a spiral or circular motion to avoid excessive friction or repetitive scrubbing (86%)
Skin protection	• Adopt a prone position twice a day and loosen the brief to ventilate the skin and decrease the humidity (57%)	• Adopt a semi-prone position twice a day and loosen the brief to ventilate the skin and decrease the humidity (86%)
Supportive care	• Recommend personalised care for populations at high risk of IAD and pressure injury in order to decrease exposure of the buttocks to a moist environment (71%) • Wear soft clothing to prevent skin abrasion (71%)	• Recommend that populations at high risk of IAD should be regularly turned over and decompression equipment should be used to decrease exposure of the buttocks to a moist and high pressure environment (86%) • Use soft cotton garments to prevent skin abrasions (100%)

rigour review of the care guidelines for the feasibility of implementation, 18 of 20 questions achieved ≥80% approval from 30 clinical nurses. Stool characteristics and quantity were recorded daily (agreement level 60.1%) and a semi-prone position was adopted twice daily (66.7%). Regarding the applicability of implementation, 19 questions achieved ≥80% approval, with an agreement level of 76.6% for recording stool characteristics per day. This item achieved 100% agreement on the expert reviews and then was not revised. The clinical experts mentioned that the IAD assessment scale in the study was very complex and limited usefulness of clinical practices.

The overall evaluation and suggestions by clinical nursing staff were as follows:

- More pictures on the IAD assessment form could be added.
- High-risk patients could be highlighted.
- The stool assessment could be translated into Chinese to facilitate reading and usage by the evaluator.
- Skin cleansing could be performed once a day or after defecation or urination.
- The skin cleansing solutions or protectants involve fees that make these a financial burden for the family.
- Some family members or caregivers may hold on their own views and not be in compliance with health education for care guidance.
- The recommendation of adopting a semi-prone position twice a day may not be performed for patients with ankylosis, limb contractures, or other limitations, so patients' positions could be performed according to individual conditions.

In the first round of consensus results from the seven clinical experts, six of 20 interventions listed did not achieve 80% approval (Table 1). The authors conducted the search and a review of the literature and then revised these items. In the second consensus, all items achieved ≥80% approval.

Table 2. Quality domain assessments by methodology experts

Quality domains	Appraiser 1	Appraiser 2	Appraiser 3	Domain scores (%)
Scope and purpose	12	12	10	92.6
Stakeholder involvement	15	13	11	75.0
Developmental rigour	27	26	21	84.1
Presentation clarity	16	14	14	88.9
Applicability	10	8	8	51.9
Editorial independence	7	8	6	83.3
Overall guideline assessment	Agree	Agree	Agree	

Table 2 shows the results of the six components reviewed by methodology experts. The suggestions provided are as follows:

- The bundle care guideline could be developed using easy-to-understand cards or booklets to facilitate folding and reading.
- This version of the bundle care guidelines and recommendations is for nurses. A caregiver version could be developed in the future.
- The items need to be clarified and revised to promote the readability and feasibility. Table 2 showed the score of applicability domain was the lowest, a standardised score of 51.9%.

Finally, the recommendations provided by the experts were included in the final version of the bundle care guidelines. One intervention of cleansing activities was removed because of the similarity to "2.3 … to avoid excessive friction or repetitive scrubbing", and 19 interventions were retained (Table 3). The

Table 3. Bundle care guidelines for IAD

Aspects	Interventions
1.0 Skin assessment	1.1 Tool: 2015 IAD severity grading tool. 1.2 Timing: Assess skin condition on admission (transfer into ward). 1.3 Timing: Assess and record skin condition at least once during each day shift in patients with urinary and bowel incontinence. 1.4 Timing: Assess skin condition every 8 hours for patients with watery stools occurring three times in 24 hours or patients with IAD. 1.5 Record stool characteristics and quantity daily according to the Bristol stool scale.
2.0 Skin cleansing	2.1 Skin cleansing could be performed after defecation or urination or once a day if no bowel movement has occurred. 2.2 Warm, clean water or skin cleanser that is near the skin's pH range should be used to clean the skin. 2.3 Cleaning in a spiral or circular motion to avoid excessive friction or repetitive scrubbing. 2.4 Disposable non-woven towels (or alcohol-free wet tissues) should be used. Non-woven cloth has a fine structure and can prevent skin friction and damage during cleaning. In addition, the use of disposable non-woven towels can prevent cross-infection.
3.0 Skin protection	3.1 After skin cleansing, the application of dimethicone-containing skin protectants is recommended for patients with intact skin that is not red but who are at risk of IAD. This product is applied around the perineum by gentle tapping to form a protective layer on the skin surface to prevent IAD. 3.2 After skin cleansing, the application of polymer acrylate skin protectants can be used if the skin is intact but red to form a transparent protective layer on the skin that protects it from excreta. 3.3 Care methods for non-intact skin after skin cleansing: (1) Skin protectants (such as products containing polymer film or dimethicone, or zinc oxide creams) that are specific for IAD skin damage should be used for non-intact skin. (2) Sealed drainage systems can be used, such as indwelling urinary catheters, an anal drainage bag system (Flexiseal), or anal plugs to decrease skin irritation by excreta and maintain skin integrity. (3) Help the patient adopt a semi-prone position twice daily and loosen the briefs to ventilate the skin and decrease humidity. 3.4 For patients with a skin infection, please consult a dermatologist for treatment recommendations.
4.0 Supportive care	4.1 Patients with bowel/urinary incontinence are at high risk of IAD. Please regularly turn these patients and use decompression equipment to decrease the exposure of the buttocks to a moist and high-pressure environment. 4.2 The use of soft cotton garments is recommended to prevent skin abrasions. 4.3 The use of highly absorbable or suitable incontinence products is important for preventing IAD. 4.4 To strengthen nursing staff education. It is difficult to distinguish stage 1 or 2 pressure injuries with herpes and IAD in clinical practice. To provide guidance to immediately discriminate these injuries for nursing staff.

bundle care guideline did not include new care techniques; rather, it included intervention obtained from experts and research methodologists. A systematic and structured bundle care guideline with a good rigour was developed. The differences between this bundle care guideline and past care standards or protocols were as follows:

- The care guideline comprised of four components – skin assessment, skin cleansing, skin protection and supportive care. The characteristics of this bundle guideline were evidence-based implementation and the feasibility of clinical practices which were validated by clinical experts.
- The skin assessment included times and tools.
- Besides skin cleansing after urination or defecation, to clean the skin in the perineal region at least once was added in the guideline.
- Empirical interventions for non-intact skin in the skin protection component were added in the guideline.

DISCUSSION

In this study, an IAD bundle care guideline was first developed using an evidence-based framework to promote the feasibility and application of implementation. The revision of care guideline consisted of four components (19 interventions) – skin assessment (five items), skin cleansing (four items), skin protection (six items), and supportive care (four items). The existing IAD assessment scale was very complicated, including area of skin breakdown (scores 0–3), skin redness (scores 0–3), and erosion (scores 0–4)[13].

Therefore, the authors recommend using the IAD severity grading tool that was proposed based on the 2015 Global IAD Expert Panel recommendations. This assessment tool could be used for the simple discrimination of injury severity of grades 0–2; the higher grade, the more serious the injury[11]. The literature showed that a combination of this grading tool and care protocol could be used for quality monitoring and research. Although the expert validity of this tool was conducted, its reliability needs to be developed[10,11]. In 2016, Taiwanese researchers revised this severity grading, evaluation tool, and preventive intervention using picture cards to promote the clinical applicability and caregivers' compliance of care guidelines[14]. In addition, the IAD assessment tool and the Braden Scale could be combined in further research to integrate the interventions of complete skin care[2].

Regarding the standard of daily cleaning for the perineal region in the day shift and the need for concrete cleansing method, the authors recommend a change in cleansing time and methods in the cleaning component by considering the patient's rest time and nurse-to-patient ratios in the night shift. In the initial guideline, the statement "repetitive cleaning or forceful cleaning is the direct cause of skin injury" needs to be removed because no relevant articles quantify the number of times and strength for cleaning or back-and-forth scrubbing[1,15].

In the skin protection component, there is no relevant literature to provide the evidence of the time duration for semi-prone positioning. Therefore, the intervention was revised not to state the time duration. The skin protectants are not reimbursed by National Health Insurance in Taiwan and the economic burden may result in difficult implementation. In addition, Beeckman et al.[16] performed an IAD intervention study – control group: perineal skin care using water and pH-neutral soap; experimental group: use of a 3-in-1 washcloth. The results showed that the use of a 3-in-1 washcloth decreased IAD prevalence. The effectiveness of IAD cleaning products and protectants was confirmed[17,18]. Therefore, we recommend that the reimbursement of IAD cleaning products and protectants could be included by the National Health Insurance to decrease economic burdens for patients and shorten skin care hours.

In the supportive care, the experts recommended that high-risk patients and individualised care needed to be more specific. The interventions should be implemented, including repositioning and use of pressure-redistributing devices to decrease the exposure of the buttocks to a moist environment[1]. The use of a soft or cotton cloth to avoid damage by abrasion was recommended by experts in the study and in the previous research[12].

In the AGREE evaluation, the score of applicability domain was the lowest, a standardised score of 51.9%. Therefore, the further study would focus on the potential organisational barriers and potential cost implications of applying the IAD care bundle guideline. The IAD bundle care guideline was developed and evaluated at the initial stage.

Limitations

There are important limitations to this study. First, the study was conducted in a medical centre, therefore our findings may not be generalisable to long-term care institutions. A second limitation is a reliable and valid instrument for the assessment of IAD, although the IAD severity grading tool in the study was recognised by the 2015 Global IAD Expert Panel. The assessment tool needs to be developed and evaluated for level of agreement and stability among users. Finally, a further study is needed to develop the interventions based on the various degrees of severity, accompanied with photographic flow charts to increase the feasibility of IAD care bundle guideline in a busy clinical setting.

CONCLUSIONS

The development of a bundle care guideline first used an evidence-based framework, including a systematic review, categories of interventions, consensus of clinical experts and nurse staff as well as evaluation of methodological experts. The IAD bundle care guideline consisted of four aspects and 19 interventions to prevent and treat skin breakdown associated with incontinence and further prevent pressure ulcers. In the future, an experimental design is needed to evaluate the efficacy of this IAD bundle care guideline. Moreover, the readability, feasibility and applicability of this initial guideline will be refined and re-evaluated to promote the clinical practice and efficacy in the further study.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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