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NURSING INTERVENTION RESULTS IN THE PREVENTION AND HEALING OF DERMATITIS ASSOCIATED WITH INCONTINENCE: A SYSTEMATIC REVIEW OF THE LITERATURE

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ABSTRACT

Incontinence-associated dermatitis (IAD) it is a common complication in people with loss of continence sphincters, which induces irritation and disruption of the skin, with impact on quality of life and increase vulnerability to pressure ulcers and secondary infections. **Objective**: Identify which nursing interventions aimed at the prevention and healing of IAD in acute and long-term care. **Method**: We conducted a retrospective survey between January 2010 and September 2016 by formulating a question in PI[C]O format in databases MEDLINE (with full text) e CINAHL (with full text), and 9 articles having been selected for analysis of a total of 537. **Results**: The observation of the skin is the gold standard. IAD Prevention: cleanse the skin with products with pH acid (*step* 1); apply emollients/moisturizers on intact skin (*step* 2); protect the skin with barrier products (*step* 3). IAD Healing: clean the skin (*step* 1); skin protection (*step* 2); exudate management (if severe IAD) (*step* 3). The identified interventions can be applied to other body regions affected by humidity. **Conclusions**: prevention, diagnosis and IAD healing is a nursing-sensitive indicators. **Implications for the nursing profession**: Nursing practice based on evidence, in a continuous improvement logic, contributed to the improvement of results in the incidence and prevalence of IAD.

Keywords: Incontinence-associated dermatitis, prevention, healing, nursing interventions.

INTRODUCTION

Incontinence-associated dermatitis (IAD) is included in a set of skin changes caused by the presence of moisture, being characterized by prolonged skin exposure to faeces and/or urine. This is a very frequent condition, taking into account that there is a significant percentage of people, mostly aged 65 and over, admitted in acute or long-term care, who suffer from urinary and / or fecal incontinence[1]. It is typically recognized as an inflammation of the skin surface characterized by redness (rash), which mainly affects the region of the thighs, buttocks and scrotum, in males and the large lips in females[2,3]. This type of lesion reflects the reaction of the skin to the aggressor agent, immediately compromising its ability to act as a protective barrier[4]. If IAD is not identified and treated in a timely manner, this blush and/or rash may develop rapidly for the local formation of vesicular abrasions and lesions that with prolonged exposure to risk factors may initiate an infectious process with high severity[2]. Thus, a cycle begins where there is a progressive increase of local inflammation and loss of cutaneous integrity[1].

Brunner et al. (2012)[5] indicate four risk factors that are related to the loss of cutaneous integrity related to incontinence, namely the presence of moisture, alteration of skin pH, colonization with microorganisms and friction. Chemically, skin contact with feces and/or urine gives rise to an increase in pH relative to physiological values, which reduces its ability to act as a barrier against the proliferation of microorganisms[6,7]. Prolonged exposure to a constantly moist environment locally causes a skin maceration that, when it evolves to epidermal erosion, makes the skin more vulnerable to the negative effect of pressure, increasing the susceptibility for the development of pressure ulcers and *Staplylococcus* infection, being able to progress to cellulitis and necrotizing fasciitis[8]. Taking into account that the skin is a variable sensitive to nursing care, patent in the Minimum Data Summary[9], the objective of the present systematic review pretends to identify which nursing interventions promote the prevention and cicatrization of IAD.

RESEARCH STRATEGY

A systematic review of the literature was carried out starting from the formulation of the following question in PI[C]O format[10]: **In relation to people admitted at acute and long-term care hospitalized at acute and long-term care (P), which nursing interventions (I) that promote prevention and healing of incontinence-associated dermatitis (O)?** A retrospective search was conducted between January 2010 and September 2016, in the databases: MEDLINE (with full text) e CINAHL (with full text), with the keywords: [(nursing) OR (prevention) OR (control) OR (treatment)] AND [(fecal incontinence) OR (urinary incontinence) OR (diaper rush) OR (erythema)] AND [(hospitalization) OR (acute care) OR (long-term care)]. From this research a total of 537 articles appeared, having been selected 9 of them.

The inclusion criteria were considered people with more than 18 years of age admitted at acute and long-term care, who were the target of the nursing intervention. Regarding the exclusion criteria, articles with no correlation with the theme were eliminated, as well as those that were repeated in both databases. In the identification of nursing interventions it was considered crucial to establish the contours for its applicability in the clinical context, and it is therefore fundamental to analyze the quality of the evidence found. In this sense, it was decided to follow the criteria approved by the *Agency of Healthcare Research and Quality*[11]. Thus, for a safe and consistent application in the clinical contexts, were mainly encompassed levels of evidence considered of high quality, that is, up to 2a, designated in table 1, were mostly included. Level 2b studies should already be incorporated with special caution in clinical practice, and Level 3 studies are contemplated to deepen knowledge about the protective and risk factors associated with IAD.

Table 1 - Levels of evidence adapted from Heidenreich, A. et al. (2013). Guidelines on prostate cancer. Netherlands: European Association of Urology.

Level	Type of evidence
1ª	High quality evidence obtained from meta-analyzes, systematic reviews of randomized controlled trials (RCT)
1b	Evidence obtained from at least one RCT
2ª	Evidence obtained from high-quality or cohort case-control studies, with a very low risk of bias and a high probability of a causal relationship
2b	Evidence obtained from at least one other type of well-designed quasi-experimental study
3	Evidence obtained from well-designed non-experimental studies, such as correlation studies or case studies
4	Evidence obtained from the opinion of experts or recognized Identities/reputable authorities

In order to clarify the course and the methodology used, the research process and selection of articles is explained in Table 2.

Table 2 - Research process and selection of articles from the systematic literature review, Portugal, 2016.

Research process and selection of articles from systematic literature review
Identification: • Number of articles identified through the search database: CINAHL: 180 • Number of articles identified through the MEDLINE search database: 357
Selection: • Number of duplicate and removed articles: 196 • Select articles: 341
Inclusion Criteria (through full reading): • Number of articles with inclusion criteria: 9 • Number of articles without inclusion criteria: 331
Included Articles (Levels of Evidence): • Number of articles with quantitative methodology: 9 **Level 1** - 1 **Level 1b** - 2 **Level 2a** - 4 **Level 2b** - 1 **Level 3** - 1

Results presentation

Author / Level of Evidence	Goals/aims	Results
Autor: Harries *et al*, 2016[12] **Type of study:** Randomized controlled trial **Participants:** Two groups of nurses submitted to an educational program on the prevention of IAD. **Level of Evidence:** 1b	Evaluate the impact on the skin of incontinent people on-the-job training and the introduction of skin cleansing products.	Prevention strategies should be implemented in order to avoid skin lesions. The combination of on-the-job training and the use of suitable cleansers has shown significant benefit to the person with injuries resulting from the presence of moisture as well as better adherence of good practice guideline in clinical setting. Recommended use of Cavilon Durable Barrier Cream (3M) and Cavilon No-Sting Barrier Film (3M) after skin rinsing. Water and soap are often used, but it is recommended that they should be acidic to avoid skin irritation.
Autor: Brunner *et al*, 2012[5] **Type of Study:** Almost Experimental **Participants:** 64 people admitted in critical and acute care, with a mean age of 67.3 years, mostly male. **Level of Evidence:** 2a	Compare two products used in the protection of the skin subject to humidity, to determine which one is more effective in maintaining cutaneous integrity and which one is the most economical.	Seventy-five percent (75%) of all participants maintained their skin intact, occurring in 17.2% of skin breakage, of which 7.8% had a moderate loss of skin thickness. Product A consists in the use of a product (one-step) that incorporates cleaning, hydration and protection. Product B (two-step) includes cleaning and use of barrier spray. The cost per day is substantially higher in products of group B ($ 6.59) vs. Products of group A (2.67$) (F [1.62] = 8.26, p = 0.006). The mean time to skin breakdown was significantly longer in product B (n = 6; 213.3 hours) vs. product A (n = 6, 91.1 hours) (F [1,11] = 5.27, p =0,045)
Autor: Sugama *et al*, 2012[13] **Type of study:** Randomized controlled trial **Participants:** 60 women aged 65 years or over with IAD, who use a permanent diaper. **Level of Evidence:** 1b	To study the efficacy of absorbent dressings (test version - designed to absorb urine at the urine excretion site) vs. common diaper, in the prevention of IAD.	Thirteen patients (43.3%) of the group with the use of absorbent dressing for bladder incontinence and 4 patients (13.3%) with diaper use, recovered fully from IAD. The group that used absorbent dressing recovered significantly faster from the lesions than did the diapering group (p = 0.009). On the other hand, there were no significant differences between the two groups due to the protection of skin moisture.
Autor: Beeckman *et al*, 2014[14] **Type of Study:** Meta-analysis **Participants:** 58 RCT studies **Level of Evidence:** 1	Identify the association between ICD and its etiological factors (incontinence and humidity) and pressure ulcers.	In most studies (86%) there was a significant association, with a relative odds ratio of 1.92 (95% CI 1.54-2.38) for urinary incontinence and 4.99 (95% CI 2.62-9 , 50) for double incontinence (p <0.05). This evidence indicates a higher risk of developing IAD in people with bladder incontinence and at the same time faecal.

Results presentation

Author/Level of Evidence	Goals/aims	Results
Autor: Lee *et al*, 2016[15] **Type of Study:** Quasi-experimental study **Participants:** 407 nurses **Level of Evidence:** 2b	To evaluate the effect of a visual program of differential diagnosis of pressure ulcer and ICD.	The education program consisted of a 50-minute lecture on the classification of pressure ulcers (PU) and case studies. The differentiation between UPs and DAI (PUCS-KT) was performed with the support of an audiovisual diagnostic tool (VDDAT), composed of 21 photographs with clinical information. The mean overall difference PUCS-KT (t = -11 · 437, P <0.001) and VDDAT (t = -21 · 113, P <0.001) from t-test was significantly increased after the program educational. The overall understanding of the UP classifications after the education program has increased. The greatest difficulty resided in the differential diagnosis between category III UP and deep tissue damage by IAD.
Autor: Campbell *et al*, 2016[16] **Type of study:** Cross-sectional descriptive study **Participants:** 2126 adults over 18 years of age hospitalized on data collection days. **Level of Evidence:** 2b	To estimate the prevalence of pressure lesions and IAD before and after the application of a protocol of good practice guidelines.	Overall, the prevalence of pressure injuries decreased from 12.8% (n = 500) in 2009 to 6.3% (n = 444) in 2013. The prevalence of IAD was first reported in 2011, IAD prevalence decreased from 10% (n = 376) in 2011 to 2.7% (n = 444) in 2013.
Autor: Kottner *et al*, 2014[17] **Type of Study:** Multicenter Study **Participants:** People 65 years of age or older who suffer from acute and long-term care incontinence. **Level of Evidence:** 3	Identify variables related to the development of incontinence-associated dermatitis	The occurrence of IAD was more frequent in males, with diabetes mellitus and elevated Body Mass Index. Fecal incontinence (OR 1.70, 95% CI 1.14-2.55), diabetes mellitus (OR 1.46, 95% CI 1.03-2.06) and the friction forces (OR 0, 65, 95% CI 0.51-0.81) according to the Braden scale item were the most relevant covariates for the presence of incontinence-associated dermatitis.
Autor: Beeckman *et al*, 2011[18] **Type of study:** Randomized controlled trial **Participants:** A total of 464 elderly, 239 of them were in the experimental group and 225 belonged to the control group. **Level of evidence:** 2a.	Compare the efficacy of using a 3-in-1 wipe in perineal care VS. the standard of treatment with neutral pH water and soap to prevent and treat IAD.	The use of a 3-in-1 wipe, impregnated with a 3% dimethicone formula, resulted in a significantly reduced prevalence of DAI and a tendency for less severe lesions. The prevalence of IAD significantly decreased in the experimental group (day 1: 22.3%, day 120: 8.1%, p = .001). The skin characteristics improved significantly between day 1 and day 120 in the experimental group: skin surface (day 1: 1.9 / 3 Vs day 120: 1.2 / 3, p = .001), flushing (day 1: 2.7 / 3 Vs day 120: 1.3 / 3, p = .001) and depth of lesions (day 1: 2.3 / 4, day 120: 1.4 / 4, p = .05)

Results presentation

Author/Level of Evidence	Goals/aims	Results
Autor: Park, 2014[19] **Type of Study:** Cohort Study Participants: 102 patients over the age of 40 and with a score of 16 or less on the Braden Scale who were admitted to the Samsung Medical Center in Seoul, South Korea. **Level of evidence:** 2a	To evaluate the effect of a silicone foam dressing with barrier effect on the development of pressure ulcers and incontinence-associated dermatitis in an intensive care unit.	The application of a silicone foam dressing decreased the occurrence and size of pressure ulcers and IAD.

DISCUSSION OF THE RESULTS

Constant skin assessment, adequate hygiene care, and continence management are key nursing activities for prevention of IAD[6,12]. Periodic skin observation and preventive care should be especially targeted to people who, in addition to fecal / urinary incontinence, have other comorbidities, such as diabetes mellitus, increased body mass index and high functional dependence[7-8,14,17].

Skin subject to constant moisture requires other care beyond the use of a cleanser, which consist in the application of a moisturizer and subsequently a barrier cream[5]. Skin protection is an essential step and it is therefore advisable to use Cavilon Durable Cream Barrier (3M) and Cavilon No-Sting Barrier Film (3M), ie the application of a long-lasting barrier cream or polymer film in spray[5,12]. The use of barrier creams may be an aid in preventing at the beginning of lesions[12] as it works as a water repellent, is used to prevent dermal inflammation[13]. In the case of desquamative and dehydrated skin, the use of an emollient or a barrier cream is strongly recommended[12]. The protectors of skin with petrolatums and zinc oxide base are used as skin protectors against irritations and hydration, for their easy accessibility and reduced cost. However, they do not have an effective barrier effect, their white and opaque coloration prevents an adequate observation of the state of the skin, remaining a thin layer that can cause skin lesions in the attempt of removal[18]. It is preferable to apply the polymer film, which, when constituted by an acrylic blend, forms a non-irritating barrier film, allows the gas exchanges of water vapor and oxygen between the skin and the outside, as well as preventing contact with the fluids body. It is not recommended for use in category I pressure ulcers without the humidity factor[5,12].

The use of a wipe impregnated with a 3% solution of dimethicone resulted in a significant reduction in the prevalence of IAD and a tendency for less severity of cutaneous lesions. This active substance of several barrier creams acts as a filler between the desquamative corneocytes, acting as a barrier against confluent moisture[18]. In severe IADs, which are characterized by the presence of erosive lesion at the level of the epidermis and dermis, with exudate and associated pain, it is recommended to apply a silicone foam dressing for treatment. This dressing can also be used as a barrier to decrease the incidence of IAD. The use of more occlusive dressings, such as hydrocolloids, is strongly contraindicated, since they increase the risk factor - moisture[19].

The use of absorbent products on an adequate size in each situation helps to prevent injuries associated with the presence of moisture[5,16].

The use of a diaper incorporating a frontal absorption zone and avoiding the reflux mechanism, allows a significant improvement of present lesions associated with the presence of moisture[13].

According to Harries et al. (2016)[5], e Lee et al. (2016)[15], the continuous training of nurses directed to the adoption of lines of good practice in the differential diagnosis between pressure ulcer and ICD and application of products based on multimedia educational programs contributed to the reduction of the incidence of IAD.

CONCLUSION

The nursing interventions directed at the person with ICD are positioned at the level of prevention, diagnosis and cicatrization. In a transversal way, all studies pointed to the importance of adequate skin inspection, constituting the gold standard of prevention and diagnosis of IAD. With regard to the prevention of ICD, three stages are generally recommended in the nursing intervention: cleansing the skin - application of emollients/moisturizers - skin protection. In cicatrization it is advised to perform 2 or 3 steps: clean the skin - skin protection - exudate management (if severe DAI). The literature also indicates the existence of variables that are protective and risky in the development of ICDs, on which nurses can intervene to improve the safety and effectiveness of their interventions, as shown in Table 3.

Table 3 - Nursing interventions in the prevention and healing of IAD

Level	Type of Evidence
Prevention	• Monitor skin integrity;
	• Clean the skin with products with acidic pH (step 1);
	• Avoid friction in drying the skin;
	• Apply emollients / moisturizers to the whole skin (step 2);
	• Protect the skin with barrier products (step 3);
	• Relieve pressure in regions at risk of IAD.
Cicatrization	• Monitor the evolution of the dimensions and depth of ICD;
	• Clean the skin with products with acid pH (step 1) or preferably use impregnated wipe in a 3% solution of dimethicone (step 3 in 1);
	• Protect the skin with barrier products (step 2);
	• Moisture management in severe DAI with silicone foam dressing.
	• Profuse sweating;
Risk Factors	• Comorbidities: diabetes mellitus and morbid obesity;
	• Double incontinence (bladder and bowel);
	• High level of functional dependence;
	• People 65 and older.
Protective Factors	• Continuous training in prevention and healing of ICD;
	• Analysis of case studies, using multimedia resources;
	• Implementation of guidelines for good practice.

Implications for the nursing profession

The implementation of the set of identified nursing interventions can also be easily applied in other regions of the body surface susceptible to damage caused by the presence of moisture, such as tracheostomies and other stomas, wounds with abundant exudate, persons subjected at oxygen therapy, or suffering from profuse sweating, especially cases of morbid obesity. The prevention and healing of IAD is a health outcome associated with nursing care. Its repercussions were more evident in the segment of the health economy, however its gains have the same translation in improving the quality of life, reducing the discomfort and pain of the person with IAD[17].

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