Original article

Investigating ICU nurses' understanding of incontinence-associated dermatitis: an analysis of influencing factors

ABSTRACT

Objective To investigate the knowledge, attitude and behaviour of ICU nurses in relation to incontinence-associated dermatitis (IAD) in patients with urinary and bowel incontinence. Following this, to identify and analyse any influencing factors to provide a basis for the formulation of standard preventative procedures and preventative nursing strategies for IAD.

Methods Convenience sampling was used to survey ICU nurses' knowledge, attitude and behaviour towards IAD. Between September and October 2019, a questionnaire designed by the researchers, that also gathered demographic data on the ICU nurses surveyed, was disseminated by the organisation's information technology processes to 508 ICU nurses. Data were statistically analysed by SPSS22.0 software.

Results The total score obtainable within the questionnaire of staff knowledge, attitude and behaviour was (73.03±7.18). This score matrix was comprised of the following sub scores: knowledge (7.23±1.40), attitude (22.53±3.21), and behaviour (43.27±5.20). The working years of clinical nurses was the main factor influencing the knowledge, attitude and behaviour scores of ICU nurses' understanding and management of IAD ($p<0.05$). Multiple linear regression analysis showed that the standard of the IAD prevention and incidence monitoring processes and daily management of IAD were correlating influencing factors of ICU nurses' total IAD score ($p<0.01$).

Conclusion: ICU nurses' knowledge of IAD improved. Similarly, ICU nurses' attitudes towards IAD was better; however, there were differences between attitudes and practices of IAD. Managers in ICU should be more cognisant of the aetiology of IAD and ensure ICU nurses are educated in associated pathophysiology, risk factors, prevalence and incidence monitoring and root cause analysis of instances of IAD. Further, managers should promote the use of standard prevention and nursing management processes to reduce the incidence of IAD.

Keywords ICU nurse; IAD; knowledge, attitude, behaviour

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INTRODUCTION

Incontinence-associated dermatitis (IAD) is a common irritant contact dermatitis that occurs in patients with urinary or faecal incontinence, and may be exacerbated by mechanical factors such as trauma and friction. Clinically, IAD may present as erythematous skin that is pink or red, has poorly defined margins, or may show variable depths of skin loss with or without vesicles or bullae. The dermis may weep if exposed[1].

The prevalence of IAD in international studies ranged from 5.7–22.8%, and the incidence ranged from 3.4–36.0%[2,3]. Domestic studies in China have shown that the prevalence of IAD in incontinent patients is 2.5–3.2%. Further, the incidence rate of incontinence in ICU patients is significantly higher than that

in general departments[4,5]. Incontinence-associated dermatitis induces pain in patients, increases the risk of stress injury to affected skin from shear and friction, and can cause secondary infection. In addition, IAD increases the cost of treatment, increases nurses' workload and presents nurses with significant clinical challenges[6]. Current global research on IAD has focused on the management and prevention of IAD[7].

After assessing the risk for patients in developing IAD, it is particularly important to select the most effective interventions as well as following any standard organisational procedures. Therefore, this study aimed to investigate the status quo of the knowledge, attitude and behaviour of ICU nurses on IAD prevention, and to use the results of the study to provide a basis for formulating standard preventative and nursing care strategies.

STUDY OBJECTIVE

This study aimed to investigate the status quo of the knowledge, attitude and behaviour of ICU nurses on IAD prevention, and to use the results of the study to provide a clinical framework for formulating standard preventative and nursing care strategies for IAD.

RESEARCH METHODS

Convenience sampling was used to select the first 500 ICU nurses from our facility to participate in the study if they met study criteria and correctly filled out the study questionnaires. Inclusion criteria were stated as:

- Registered clinical nurses with more than 1 year's work experience.
- Nurses who gave informed consent.
- Nurses who volunteered to participate.

Exclusion criteria included:

- Nursing experts involved in the design of the study questionnaire.
- Nurses currently undertaking further education, training or study.
- Nurses currently on maternity or private leave.

Research tools

General questionnaire

A general data questionnaire to capture study participants' demographics was designed by the researchers. The fields included age, gender, level of hospital / clinical care, education, job title, years working, job levels and categories, ways of gaining knowledge about IAD, and any recent training time, as well as comprehension of the standard of the IAD prevention processes, IAD statistical rates and monitoring, and daily clinical care of IAD.

Knowledge, attitude and behaviour questionnaire

The questionnaire to examine ICU nurses' knowledge, attitude and behaviour of IAD was designed by the researchers following an extensive literature research on questionnaire design. A small pilot questionnaire was evaluated for content validity by three wound/ostomy specialist nurses, three experts in skin assessment, management staff and other researchers with expertise small sample enquiry form questionnaires. The content validity index (CVI) of the questionnaire was 0.811, and the Cronbach's coefficient was 0.843, showing good reliability and validity.

The final questionnaire consisted of three parts – knowledge, attitude and behaviour, with a total of 33 items.

The knowledge questionnaire contained 11 items, including the concept of IAD, risk factors, risk assessment, IAD grading, and the identification of clinical manifestations of pressure ulcers. For each item, 'yes' was 1 point, 'no' or 'not sure' was 0 point, and the total score ranged from 0–11 points. The higher the score, the better the knowledge of IAD.

The attitude questionnaire was used to ascertain the degree of ICU nurses' understanding of standard nursing measures to be used by ICU nurses to prevent IAD. There were a total of seven items. A Likert 4 grading method was adopted to rate responses as: 'strongly disagree', counted as 1 point; 'disagree' as 2 points; 'agree' as 3 points; and 'strongly agree' as 4 points. The total score ranged from 7–28 points. The higher the score, the better the agreement on the importance of standard IAD prevention.

The behavioural questionnaire was used to understand concordance with implementation of standard nursing measures to prevent IAD in ICU nurses' clinical practice. There were a total of 15 items. Similarly, a Likert 4 grading method was adopted, with 1 point for 'never', 2 points for 'sometimes', 3 points for 'often' and 4 points for 'always'. The total score ranged from 15–60 points. The higher the score, the better the implementation of standard preventive IAD care measures.

Data collection methods

From September to October 2019, all questionnaires were uploaded to and data was collected through our facility's internal information technology star platform. This ensured the quality of information collected and a process for invalidating questionnaires where the answer time was less than 120 seconds. In order to prevent duplication or multiple survey responses being received, only the first valid answer according to the IP address and answer time was accepted.

Statistical analysis

SPSS22.0 software was used for data entry and statistical analysis. Frequency, composition ratio, mean ± standard deviation were used to describe categorical data, one-way anova and t test were used to compare the differences of ICU nurses' IAD knowledge, attitude and behaviour scores, and multiple linear regression was used to analyse the factors influencing ICU nurses' IAD behaviour. Double-sided test, test level mean $\alpha=0.05$. Statistically significant difference is measured at ($p<0.005$).

RESULTS

General information

A total of 508 questionnaires were issued and 508 were recovered, of which 500 were valid, with an effective recovery rate of 98.4%.

Demographically, among the 500 ICU nurses, 7.8% were men and 92.2% were women. Participants' ages ranged as follows: 33.2% were aged 20–25; 29.4% were aged 26–30, 29.8% were aged 31–40 and 7.6% were aged 40 and above. Years of clinical nursing service showed 9.2% had nursed for less than 1 year, 20.0% for 1–3 years, 41.4% for 4–10 years, 21.8% for 11–20 years, and 7.6% for more than 20 years. With regard to education, respondents had secondary technical school 7.6%, junior college 38.2%, and bachelor's degree or above 54.2%. Professional titles included 36.4% as nurses, 38.6% as primary nurses, 21.2% as chief nurses, 3.8% as deputy chief nurses. Duties encompassed: responsibility nurse (71.8%), nursing group leader (16.2%), head nurse (8%), and wound stoma therapist (4%).

ICU nurses' knowledge of IAD

ICU nurses scored 0–11 (7.23±1.40) points for their knowledge of IAD. The top three scoring items were 'definition of IAD', 'location of IAD' and 'type of IAD skin protectant', with the correct rates of 98.8%, 96.6% and 94.0% respectively. The next three highest scoring items were 'local skin exposure to faecal fluid reduces PH and disrupts skin barrier function', 'use of skin humectant to protect faecal-impregnated skin in patients with IAD', and 'soft tissue skin lesions in patients with IAD from bottom to top', with correct rates of 4.6%, 29.2% and 34.0% respectively.

ICU nurses' attitude towards IAD

The score of ICU nurses on IAD was 7–28 (22.53±3.21). The three items with the lowest scores were 'IAD quality control and monitoring should be carried out', 'early use of stool collection device when stool count exceeds 3 times or is not formed', and 'standard preventive procedures can reduce the incidence of IAD'. The scores were (2.61±0.84) points, (3.07±0.68) points, and (3.27±0.58) points respectively.

ICU nurses' behaviour and IAD

ICU nurses scores in terms of behaviour and clinical understanding of the management of IAD ranged between 27–59 (43.27±5.20) points. The lowest scored three entries were 'in the occurrence of IAD choose complex alum powder solution to clean local skin', 'for daily cleaning peri-anal skin in patients with IAD choose dry cleaning fluid' and 'using IAD risk assessment scale to evaluate the risk factors of patients'. The scores were (1.57±0.83) points, (1.85±0.66) points and (2.17±1.02) points respectively.

Univariate analysis of ICU nurses' scores of IAD knowledge, attitude and behaviour

Univariate analysis showed that ICU nurses had different scores in IAD knowledge, attitude and behaviour based on their age and years of clinical nursing service. The post category of ICU nurses and the last time learning occurred to gain knowledge in IAD had different scores for IAD knowledge. ICU nurses with different gender, age, years of clinical nursing service, post level, hospital level, post category, professional title and education had different attitudes towards IAD.

ICU nurses' years of working as a clinical nurse, access to information on IAD knowledge, last time to gain knowledge of IAD, formulation of IAD standard prevention procedures, incidence monitoring and analysis of IAD, and daily attention to IAD, all had different scores for IAD. The difference was statistically significant ($p<0.05$). See Table 1 for details.

Multivariate analysis of scores influencing ICU nurses' IAD behaviour

The score of ICU nurses' IAD behaviour was taken as the dependent variable, and the variables with statistical significance in the univariate analysis were taken as independent variables (assignment is shown in Table 2) for regression analysis ($\alpha_{enter}=0.05$, $\alpha_{eliminate}=0.10$). The results showed that the establishment of IAD standard prevention procedures, the monitoring and analysis of IAD incidence, and daily attention to IAD were the influencing factors of ICU nurses' score of IAD ($p<0.01$) (see Table 3).

DISCUSSION

The knowledge level of ICU nurses in preventing IAD needs to be improved

This study showed that the knowledge score of ICU nurses on the prevention and treatment of IAD was (7.23±1.40), from a total score of 11. ICU nurses who had been engaged in nursing work for 4–10 years had a higher knowledge of IAD (7.21±1.55), and the knowledge level of ICU nurses who had been engaged in nursing work for 1–3 years was lower (6.86±1.39); a statistically significant difference ($p<0.005$). These results show that ICU nurses' knowledge of IAD is low and are similar to that reported by Xiao-xue Zhang[8] who analysed the items 'topical skin exposed to the fluid of the faeces', 'the Ph value decreased, destruction of skin barrier function', 'give IAD patients skin moisturiser to use to protect skin from faecal fluid'.

The results further suggest ICU nurses' understanding of the pathogenesis of IAD, its resultant damage to the skin and secondary tissue stressors, and the correct selection of skin protectants to manage IAD is poor. In addition, there was a statistically significant difference in ICU nurses' understanding of IAD-related knowledge among different job categories and the last time ICU nurses attended any education about IAD ($p<0.05$). This would suggest that managers should conduct systematic training for ICU nurses in the form of a flipped classroom model whereby staff are provide with information on IAD before participating in usual classroom style teaching to broaden understanding through discussion or other learning activities. This approach may also improve nursing staff's participation in and interest in learning.

For nurses who have worked in clinical nursing for more than 20 years, ICU nurses of seniority and with senior positions had a good knowledge base and command of IAD, which may be related to their stricter role requirements, more internal and external learning opportunities, and accumulation of rich clinical experience[9]. The knowledge of IAD by wound stoma therapists is better than that of ICU nurses, which may be related to the systematic training of these specialist nurses which enhances their knowledge of IAD and associated disruption to skin integrity[10]. It is suggested that comprehensive basic nursing education and ongoing in-service education on IAD should be carried out, starting within undergraduate nursing programs.

ICU nurses' attitude towards preventing IAD

The score for ICU nurses' attitude towards IAD was (22.53±3.21) from a total 28 points. ICU nurses' awareness of the pathophysiology, prevention and treatment of IAD was high, as can be seen from the results of the survey. Those ICU nurses with higher qualifications, higher clinical positions/titles and wound stoma therapists demonstrated a more positive attitude to understanding IAD and were more cognisant of the ramifications of IAD. Their personal and professional sense of responsibility and compliance with organisational procedures was also higher[11].

In this survey, the item 'conduct IAD quality control and monitoring' was scored low. This may indicate the department may not have included the incidence of IAD in quality audit inspections, or the quality inspection results may be inconsistent with individual performance. The item 'early use of stool collection device when stool count is more than 3 times or incomplete' also had a low score, which may be because there were no stool collection sets available, or nurses lacked awareness of this protocol, or there was a lack of awareness of local skin risk assessment processes for incontinent patients in relevant departments. In regard to 'standard prevention procedures can reduce the incidence of IAD', the score was low, which may indicate insufficient attention may not have been paid by relevant departments to IAD prevention and treatment procedures, or that staff did not conform with departmental procedures. Therefore, it is particularly important to suggest the establishment of effective standard prevention and quality inspection procedures for IAD.

The behavioural level of ICU nurses in preventing IAD needs to be improved urgently

Evaluation of the results of this study showed that the total score of prevention behaviours of ICU nurses for IAD was 27–59 (43.27±5.20) points. Responses to the survey question, 'the use of IAD risk assessment scale to evaluate the risk factors of patients with IAD' was low. However, ICU nurses' per shift behaviour scored higher in assessment of patients with skin conditions. This suggests the ICU nurses, when conducting daily skin assessments of incontinent patients, did not use the IAD risk assessment scale or the department did not provide a uniform standard IAD risk assessment scale. International studies suggest that all incontinent patients are at risk for IAD and, therefore, a personalised prevention plan should be implemented to reduce the risk of IAD and related stress injury to the skin's IAD[12].

In terms of skin cleansing methods for patients with IAD, the results of this study showed that 'patients with IAD used compound alum powder solution to clean local skin' had a low score, indicating that ICU nurses were not familiar with its pharmacological characteristics or had never been exposed to it. The low score for 'daily cleaning of perianal skin in patients with IAD' indicates that ICU nurses still use alcohol wipes or warm water with dry paper towels to clean perianal skin when removing faecal fluid from faecally incontinent patients. One study has reported that the use of a pH neutral soap with water may interfere with skin barrier function[13]. It is recommended that our facility uniformly use the 'no-rinse' skin cleaning fluid close to the pH value of the skin.

In relation to skin protection strategies for patients with IAD in this study, the question 'ICU nurses use skin humectant to protect moist skin in incontinent patients', scored low. This indicates that the lack of knowledge of skin protection measures for incontinent patients may lead to improper clinical behaviour in terms of prevention and treatment strategies. For patients with faecal incontinence, it is advisable to keep the skin dry by using protective skin agents after each cleaning[14].

Factors influencing ICU nurses' prevention of IAD

This study showed that ICU nurses of different ages and years of clinical nursing service had different scores on IAD knowledge, attitude and behaviour. ICU nurses of different genders, ages, years of clinical nursing service, post levels, hospital levels, post categories, professional titles and education had different scores on IAD. These outcomes are similar to the study of Guo Jin et al.[15], but different from the study of Zhang Xiao Xue et al.[16]. The main reason for the differences between these study analyses may be that the distribution of different hierarchical structures in ICU nurses is quite different, which also reflects the actual structure and role of clinical nurses.

The access to IAD knowledge and the last time to receive education on IAD had different scores on IAD behaviour. It indicates that receiving recent education on IAD can change the focus and approach of ICU nurses and it also encourages them to learn the latest trends in the prevention and treatment of IAD at home and abroad by attending academic conferences and consulting the literature, thus further influencing their knowledge, attitude and behaviour towards ICU IAD. It is suggested that the training methods of nurses should be diversified to include modern media technology (e.g. online apps) which are easily accessible, and that the courses for IAD should be repeated regularly. These measures would make it easier for nurses to learn and improve their knowledge and skills of IAD.

Table 1. Univariate analysis of knowledge attitude and behaviour of ICU nurses in preventing IAD (n=500, χ±S, points)

Project	Case (%)	Knowledge			Attitude			Behaviour		
		Score	Statistic value	p value	Score	Statistic value	p value	Score	Statistic value	p value
Gender			0.141*	0.888		1.989*	0.047		-0.054*	0.957
Male	39 (7.8)	7.26±1.39			23.51±2.94			43.23±5.79		
Female	461 (92.2)	7.22±1.40			22.45±3.22			43.28±5.16		
Age (years)			2.948**	0.032		7.173**	<0.001		2.877**	0.036
20–25	166 (33.2)	7.01±1.39			21.70±2.76			43.23±5.51		
26–30	147 (29.4)	7.20±1.55			22.55±3.74			43.84±5.13		
31–40	149 (29.8)	7.47±1.25			23.31±3.10			43.32±4.99		
≧40	38 (7.6)	7.32±1.29			23.05±2.26			41.08±4.45		
Nursing working			3.060**	0.017		5.434**	<0.001		2.986**	0.019
<1year	46 (9.2)	7.35±1.05			21.50±2.59			41.83±6.06		
1–3 years	100 (20.0)	6.86±1.39			21.72±2.67			43.42±5.12		
4–10 years	207 (41.4)	7.21±1.55			22.60±3.55			43.84±5.19		
11–20 years	109 (21.8)	7.52±1.23			23.47±3.22			43.39±5.04		
≧20 years	38 (7.6)	7.26±1.26			22.89±2.26			41.26±4.20		
Hierarchy			2.297**	0.044		6.246**	<0.001		0.666**	0.649
N0	78 (15.6)	6.99±1.43			21.95±2.81			42.55±6.29		
N1	153 (30.6)	7.05±1.39			21.62±3.11			43.65±4.94		
N2	117 (23.4)	7.24±1.51			23.27±2.98			43.37±5.29		
N3	87 (17.4)	7.51±1.39			23.13±3.51			43.55±5.00		
N4	53 (10.6)	7.47±1.01			22.98±3.24			42.66±4.23		
N5	12 (2.4)	7.75±1.35			24.50±3.11			43.00±5.46		
Hospital grade			2.866**	0.091		7.820**	0.005		1.958**	0.162
Second	179 (35.8)	7.08±1.31			22.00±2.89			42.84±5.18		
Tertiary	321 (64.2)	7.31±1.44			22.83±3.34			43.52±5.21		
Position			4.577**	0.004		11.253**	<0.001		1.303**	0.273
Nurse	359 (71.8)	7.10±1.46			22.03±3.20			43.14±5.19		
Group leader	81 (16.2)	7.42±1.19			23.96±2.95			44.23±5.61		
Head nurse	40 (8)	7.60±0.98			23.53±2.73			42.50±4.86		
Therapist	20 (4)	8.00±1.45			23.80±2.70			43.40±4.05		
Title			2.348**	0.072		7.702**	<0.001		2.511**	0.058
Nurse	182 (36.4)	7.04±1.26			21.66±3.03			43.38±5.28		
Primary	193 (38.6)	7.24±1.49			22.91±3.44			43.85±5.49		
Intermediate	106 (21.2)	7.43±1.49			23.18±2.92			42.26±4.55		
Deputy high	19 (3.8)	7.63±0.89			23.53±2.14			42.05±4.02		
Education level			2.620**	0.074		5.825**	0.003		0.356**	0.699
Technical college	38 (7.6)	7.18±1.13			21.45±2.55			42.92±5.13		
Undergraduate	191 (38.2)	7.05±1.42			22.16±3.22			43.51±5.19		
	271 (54.2)	7.35±1.41			22.95±3.22			43.15±5.24		
Last study time			3.655**	0.006		0.530**	0.714		9.352**	<0.001
1 week	86 (17.20	7.23±1.32			22.48±3.44			44.09±5.21		
1 month	139 (27.8)	7.46±1.18			22.83±3.33			44.76±5.09		
3 months	104 (20.8)	7.28±1.17			22.54±3.35			43.48±4.76		
6 months	57 (11.4)	7.37±1.23			22.21±3.37			42.40±4.46		
1 year	114 (22.8)	6.82±1.85			22.37±2.63			41.10±5.35		

Table 1 continued. Univariate analysis of knowledge attitude and behaviour of ICU nurses in preventing IAD (n=500, χ±S, points)

Project	Case (%)	Knowledge			Attitude			Behaviour		
		Score	Statistic value	*P* value	Score	Statistic value	*P* value	Score	Statistic value	*P* value
Standard process			0.527*	0.598		0.041*	0.967		6.965*	<0.001
Yes	342 (68.4)	7.25±1.32			22.54±3.44			44.33±5.16		
No	158 (31.6)	7.18±1.57			22.53±2.63			40.99±4.53		
Monitoring and analysis			0.397*	0.691		1.278*	0.202		6.467*	<0.001
Yes	314 (62.8)	7.25±1.36			22.68±3.47			44.39±5.21		
No	186 (37.2)	7.19±1.48			22.30±2.70			41.39±4.63		
Focus on IAD			4.135*	<0.001		1.677*	0.094		5.275*	<0.001
Yes	440 (88.0)	7.32±1.31			22.62±3.26			43.72±5.13		
No	60 (12.0)	6.53±1.82			21.88±2.68			40.03±4.62		

Note: * *t* value; ** *F* value

Daily attention to IAD, formulation of IAD standard prevention procedures, monitoring of IAD incidence, and analysis of behaviours affecting ICU nurses' IAD practices

Study findings show that ICU nurses should pay closer attention to IAD in their daily practice and should develop and/or adhere to IAD standard prevention procedures. Meanwhile, monitoring and analysing the incidence of IAD are factors that influence ICU nurses' IAD prevention behaviours. Currently, there are few relevant studies, especially those based on information-based monitoring of the incidence of IAD, to compare with. Na et al. studied and developed standardised nursing procedures for IAD which could reduce the risk of IAD in incontinent patients and improve the level of nurses' knowledge of IAD prevention[17]. Jingru et al. used project management to prevent IAD in ICU patients, and the incidence of IAD decreased from 33.3% to 14%[18]. In the study, 68% of ICU nurses' departments had developed IAD standard prevention procedures, indicating that IAD had attracted the attention of hospital managers, while 32% of ICU nurses' departments did not develop IAD standard prevention procedures. The incidence of IAD was monitored and analysed in 62% of ICU nurses' departments, while the incidence of IAD was not monitored and analysed in 38% of ICU nurses' departments. While 88% of ICU nurses had daily clinical practice with IAD, 12% of ICU nurses had no daily IAD practice.

Study limitations

There are limitations in this study. First, on the basis of referring to a large amount of literature nationally and internationally, the researchers designed a questionnaire on IAD knowledge, attitude and behaviour of ICU nurses. Although the content validity and reliability of the questionnaire were tested, and the preliminary results showed the questionnaire had good reliability and validity, further tests are still needed. Secondly, the sample size of this study is still small and unevenly distributed, which may affect the accuracy of the results. Thirdly, more than 90% of participants in this study came from secondary and tertiary hospitals in Guangdong province, China, which did not cover all hospitals in this region; therefore, the convenience sample may not be reflective of all ICU nurses' knowledge, attitude and behaviours of IAD. In the future, the authors need to revise and improve the questionnaire and carry out high-quality and large-sample data collection and research.

SUMMARY

To sum up, the knowledge level of ICU nurses on the management and prevention of IAD still needs to be improved. There is a lack of systematic on-the-job IAD education and training. ICU nurses have a good attitude towards IAD prevention, with different attitudes and practical behaviours. Managers should promote and provide theoretical and clinical education on IAD and ensure clinical nurses know the pathophysiology, risk factors, and prevention and treatment strategies for IAD. Further, effective standard prevention procedures and preventive nursing strategies, so as to promote the standardisation of IAD nursing and reduce the incidence of IAD, should be developed.

Table 2. Independent variable assignment

The independent variables	Assignment way
Develop IAD standard prevention procedures	No=0 ; Yes=1
IAD incidence was monitored and analysed	No=0 ; Yes=1
Pay attention to IAD on a daily basis	No=0 ; Yes=1

Table 3. Multi-factor analysis of IAD among ICU nurses

Variable	*B* value	Standard error	*β* value	t value	p value
Nurses scored for incontinence-related dermatitis behaviour					
1 Constant term	40.994	0.396	—	103.547	<0.001
Develop IAD standard prevention procedures	3.334	0.479	0.298	6.965	<0.001
Nurses scored for incontinence-related dermatitis behaviour					
1 Constant term	41.423	0.364	—	113.700	<0.001
IAD incidence was monitored and analysed	2.975	0.462	0.277	6.441	<0.001
Nurses scored for incontinence-related dermatitis behaviour					
1 Constant term	40.082	0.650	—	61.687	<0.001
Pay attention to IAD on a daily basis	3.636	0.693	0.229	5.243	<0.001

[1)] R^2=0.089, Adjust R^2=0.087, F=48.504, P=<0.001;
[2)] R^2=0.077, Adjust R^2=0.075, F=41.488, P=<0.001;
[3)] R^2=0.052, Adjust R^2=0.050, F=27.487, P=<0.001;

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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REFERENCES

1. Beele H, Smet S, Van Damme N, Beeckman D. Incontinence-associated dermatitis: pathogenesis, contributing factors, prevention and management options. Drugs Aging 2018;35(1):1–10.
2. Gates BP, Vess J, Long MA, Johnson E. Decreasing incontinence-associated dermatitis in the surgical intensive care unit: a quality improvement project. J Wound Ostomy Continence Nurs 2019;46(4):327–331.
3. Gray M, Giuliano KK. Incontinence-associated dermatitis, characteristics and relationship to pressure injury: a multisite epidemiologic analysis. J Wound Ostomy Continence Nurs 2018;45(1):63–67.
4. wen Z, Qixia J, Yanxia G, Yuhong Z. A multicentre study on the status and prevention of incontinence related dermatitis. J Med Graduate Students 2016;29(6):633–638.
5. Suping T, Suibing R, Haishan X, Man L, Dongrong Z. Analysis of incontinence dermatitis in inpatients and its nursing measures. Chinese Nursing Ed 2015;12(7):554–557.
6. Dorothy D, Joan J, Peter K, et al. Incontinence-associated dermatitis: consensus statements, evidence-based guidelines for prevention and treatment, and current challenges. Journal of WOCN 2012;39(3):303–315.
7. Zhou Han YJ, hu Ailing ZL. Bibliometric analysis of nursing research on incontinence related dermatitis based on Web of Science. General Nursing 2019;17(11):1284–1287.
8. Xiaoxue Z, Xinran W. Investigation on knowledge, practice, sources and needs of ICU nurses with incontinence dermatitis. Chinese Nursing Manage 2017;17(8):1119–1122.
9. Yayan C, Duozi C. Investigation on the cognition status of incontinence dermatitis and structured nursing among 1429 nurses in bozhou. Anhui Medical 2019;40(5):573-577.
10. Huan L, Ning N, Yongming T. Investigation on ICU nurses' cognition of incontinence dermatitis in a hospital in Sichuan province. China J Practical Nurs 2013;29(27):64–66.
11. Wanru X, Shiwei Y, Hui C, Lijuan H, Yajun P, Yi S. Investigation of 46 skin management liaison staff on prevention of incontinence related dermatitis. J Nurs 2017;24(4):51–55.
12. Nelson K. The prevention and treatment of incontinence-associated dermatitis. Br J Nurs 2018;27(19):1101–1102.
13. Beeckman D, Verhaeghe S, Defloor T, Schoonhoven L, Vanderwee K. A 3-in-1 perineal care washcloth impregnated with dimethicone 3% versus water and pH neutral soap to prevent and treat incontinence-associated dermatitis: a randomized, controlled clinical trial. J Wound Ostomy Continence Nurs 2011;38(6):627–634.
14. Qiaoyan L, Meifen S, Chao W, Zhuo W, Jianping D, Zunjia W. Investigation and analysis of incontinence and incontinence related dermatitis. China J Practical Nurs 2015;31(33):2545–2549.
15. Jing G, Huiping Y, Lifang Z, et al. Investigation on the status of knowledge and practice of incontinence dermatitis among ICU nurses in island area and analysis of influencing factors. Chinese Study Maternal Child Health 2017; 28(S3):530–531.
16. Xiaoxue Z, Xinran W. Investigation on knowledge, practice and knowledge demand of incontinence dermatitis of ICU nurses in grade a hospitals in Beijing. Nurs Res 2017;31(33):4257–4259.
17. Na L, Yanjun L, Lei G. Analysis on the effect of standardized nursing process on prevention of incontinence related dermatitis in elderly patients with incontinence. J Practical Clin Med 2019;23(16):114–120.
18. Jingru L, Wanxian L, Qiang L. The effect of project management on prevention of incontinence related dermatitis in ICU patients. J Nurse Develop 2017;32(6) 550–552.