

Title: Clinician knowledge of incontinence-associated dermatitis: A multisite survey of healthcare professionals in acute and sub-acute settings

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ABSTRACT

PURPOSE:

Clinicians' knowledge of the prevention and management of incontinence-associated dermatitis (IAD) plays an important role in the clinical care and health outcomes of patients with incontinence. This study aimed to examine clinicians' knowledge of IAD using the Barakat-Johnson Incontinence-Associated Dermatitis Knowledge Tool (KnowIAD).

DESIGN:

A cross-sectional multicentre survey was conducted from November 2019 to January 2020. The KnowIAD, an 18-item validated instrument that measures knowledge of IAD in the domains: etiology and risk, classification and diagnosis, and prevention and management, was administered to a cross-section of eligible clinicians.

SUBJECTS AND SETTING:

The setting was six hospitals across five health districts across New South Wales, Australia. Participants were nurses (registered nurses, enrolled nurses, assistants in nursing), doctors, allied health professionals (occupational therapists, dietitians, physiotherapists) and students (nursing and allied health).

METHODS:

Participants anonymously completed hard copy surveys and consent was implied upon receipt of a completed survey. Descriptive and exploratory analyses were conducted to quantify clinicians' knowledge about the etiology and risk, classification and diagnosis, and prevention and management of IAD. A mean knowledge score of 70% was considered to be satisfactory.

RESULTS:

A total of 428 respondents completed the survey. For the etiology and risk domain, 363 respondents (84.8%) obtained a score of $\geq 70\%$ correct responses. 68 respondents (15.9%)

achieved $\geq 70\%$ correct responses for the classification and diagnosis domain, and; 87 respondents (20.3%) achieved $\geq 70\%$ correct responses for the prevention and management domain. Overall, 135 respondents (31.5%) achieved $\geq 70\%$ correct responses for the entire set of items.

CONCLUSION:

Clinicians tend to have low knowledge and recognition of IAD, particularly in the areas of classification and diagnosis, as well as prevention and management, compared with the knowledge of how IAD is caused and the risk factors. Further, this study has identified knowledge gaps for further education which, in turn, will lead to quality-of-life improvements among patients.

KEYWORDS

Incontinence-associated dermatitis, Knowledge, Survey, Clinicians

Introduction

Clinicians' knowledge of skin conditions in clinical care plays a highly important role in the prevention of skin breakdown. The occurrence of skin breakdown is a measure of the quality of care.¹ An understanding of skin conditions, types of skin injuries, and prevention and treatment will enhance clinical care and minimise skin breakdown. However, many skin conditions, such as incontinence-associated dermatitis (IAD), are under-reported and misdiagnosed.² IAD is a common, under-recognized and painful skin condition that is caused by the erosion of the skin from prolonged exposure to urine and/or feces from incontinence.³ If untreated, IAD can lead to excoriation and skin breakdown and potential infection by skin flora (e.g. *Candida albicans*), leading to increased inflammation and further skin breakdown.^{4,5} Patients with IAD suffer from considerable discomfort with pain, burning and itching in the affected areas (e.g. buttocks, perineum and gluteal clefts). IAD can result in serious consequences, including depression, distress, low self-esteem, embarrassment, shame, feelings of loneliness and negative impacts on quality of life.⁶

Additionally, patients with incontinence and IAD are at high risk of developing a pressure injury (PI).⁷⁻⁹ Beeckman et al. (2014) conducted a systematic review of 58 studies found a significant association between IAD and PI development, implying that reviewing patients for incontinence and moisture should be part of the nursing assessment in everyday practice.⁷ If incontinence is mistreated and IAD is unrecognized or misdiagnosed, the patient's risk of developing a PI is significantly increased.^{8,10-12}

Published reports of the prevalence of IAD in hospitals varies with studies finding rates of prevalence from 5 to 50%.^{8,13} One study in Germany reported a prevalence of 5.2% of IAD across 78 aged care long-term settings.¹⁴ Findings from a cross-sectional study conducted in an Australian acute care hospital found an IAD prevalence of 42% among incontinent

patients.¹⁵ A study conducted in the United States using a large dataset of patients in acute care facilities in 36 states reported IAD prevalence of 45.7% among patients who were suffering from incontinence.⁸ This high prevalence of reported IAD is a significant health concern and a burden on health systems worldwide. Thus, prevention and treatment of IAD should be considered a health priority.

Prevention and treatment of IAD comprise of several evidence-based strategies aimed at maintaining skin integrity. In 2015, a best practice guideline for the prevention and management of IAD was published.³ This guideline provides a critical appraisal of studies by an international expert group, issuing strong recommendations for IAD identification, prevention and management. Internationally, few studies have implemented components of the guideline to reduce IAD, with promising results.¹⁶ However, there is little research on the implementation of the guideline as a bundled approach or as part of a large-scale study.

Ensuring clinicians possess sufficient knowledge of IAD and utilize evidence-based guidelines for IAD is essential for the prevention and management of this condition and to ensure patient safety. Understanding the extent of clinicians' knowledge of IAD can identify knowledge gaps and consequently inform the translation of evidence-based IAD guidelines into clinical practice.¹⁷ Only two previous studies have examined clinicians' knowledge in relation to IAD prevention and management.^{18,19} Sahin et al. (2019) administered a 59-item survey on 126 intensive care unit (ICU) nurses working in one tertiary hospital in Turkey to determine their knowledge of IAD. The survey was not subjected to validity and reliability testing, as acknowledged by the authors. However, Sahin et al's. results indicated that ICU nurses' knowledge of IAD was low, and the authors recommended further studies examine larger sample sizes across a range of settings. Tay et al.¹⁹ developed and tested the validity and reliability of an instrument to determine knowledge, attitudes and practices associated

with IAD on 263 registered nurses. This study focussed on psychometric instrument evaluation and did not report respondents scores for subscales of knowledge, practice or attitudes. Lack of clinician knowledge and awareness of IAD contributes substantially to the development and deterioration of IAD.^{2,10,19,20}

This paper reports on Phase One of a multicentre, multimethod translational research study aimed at implementing the evidence-based guidelines³ to prevent and manage IAD in one state in Australia.¹⁷ Specifically, this paper examines clinician knowledge of identifying, treating, and preventing IAD.

Method

Design

A cross-sectional multicentre survey measuring knowledge of IAD assessment, prevention and management was conducted between November 2019 and January 2020. The study was approved by the local health district hospital research ethics committee (approval number: HERCC/EXCOR\19-05; X19-0121 & 2019/ETH08742).

Setting

The setting was six public hospitals (four tertiary hospitals, one regional and one rural) in five health districts across New South Wales (NSW), Australia. Three health districts are in a metropolitan area, and two health districts are in a rural/regional area. Of the four metropolitan hospitals, three 28-bed wards were included in the study; and of the two regional hospitals, three 15-bed wards were included. These wards included sub-acute and rehabilitation medicine, general medical, acute geriatrics, and mixed surgical and palliative care.

Participants

All registered nurses, enrolled nurses, assistants in nursing and undergraduate student nurses, doctors, allied health practitioners (occupational therapists, dietitians and physiotherapists) and allied health undergraduate students working on the study wards at the time of data collection were invited to participate.

Instrument

A previously validated and tested survey developed by Barakat-Johnson et al. (Barakat-Johnson Incontinence-Associated Dermatitis Knowledge Tool [KnowIAD])²¹ was used to measure participating clinicians' knowledge of IAD. The survey comprised 18 items that examine three different domains: etiology and risk; classification and diagnosis; and prevention and management. The response options were in forced choice format: true/false/don't know. One point was awarded for each correct response. An incorrect response, a missing response, or a response of "don't know" scored zero points for the item. Hence, the ranges of possible scores were as follows: 0 to 7 points for the etiology and risk domain, 0 to 5 points for the classification and diagnosis domain, and 0 to 6 points for the prevention and management domain. Sum scores of each domain were calculated to obtain the total score. The maximum score was 18 and a mean knowledge score of 70% was considered to be satisfactory.²¹ The survey has been demonstrated to have good properties of validity and reliability. Composite reliability values were calculated to be 0.750 to 0.755.²¹ Additional demographic data was collected, including participants' health profession, years of experience and clinical ward area.

Study Procedures

Following ethics and site governance approvals, permission to invite participants was obtained from the managers of the unit or ward by a research officer designated at each hospital. These research officers were experienced nurses and/or researchers. All nurses,

doctors, allied health practitioners, and students working on the study wards were informed of the study and allocated a time to complete the survey. At the allocated time, the research officer explained the purpose and procedure of the study and distributed the survey via hard copy by hand to the staff. Student nurses were invited to complete the survey with the permission of their registered nurse preceptor. A participant information sheet containing the purpose, procedure and confidentiality was provided with the survey for participants to keep. Participant consent was implied upon the return of a completed survey. Participants were supervised by the research officer to ensure no collusion. The surveys were completed in a quiet room on the ward/unit. All responses were filled out anonymously. The expected time to complete the survey was 15-20 minutes. The responses were entered directly into a REDCap (Research Electronic Data Capture) electronic database. REDCap is a secure web-based platform.²²

Data analysis

Data were exported as an Excel file and then analyzed using IBM SPSS Statistics Version 26²³ and Stata Statistical Software (Release 14).²⁴ Data were crosschecked for accuracy and incomplete data were coded as missing. Descriptive and exploratory analyses were conducted on the data. The distribution of each set of domain scores and the extent of any correlation between them was assessed. The extent of missing data and its suitability for imputation methods were also assessed. Similar ward and role types reported by respondents were grouped as appropriate to avoid analysis of low frequency groups. A series of multivariate analyses of variance (MANOVA) was conducted to assess the significance of ward, job role and years of experience on scores in the three domains of the IAD survey. For these analyses, the roles of Medical Practitioner, Senior Medical Practitioner, and Allied Health Practitioner were combined into a single group denoted *AHP/Doctor*; this group comprised healthcare

professionals least likely to prevent, diagnose or treat IAD. Undergraduate student nurses and allied health students formed a second group, *Student*, for comparative analysis, with all remaining categories (registered nurse, enrolled nurse, assistant in nursing) being considered as a single group *Nurse*, which was considered to be the reference category. A 2-block sequential modelling strategy was adopted, with respondent *ward*-related variables considered to comprise Block 1; and respondent *role*-related variables and years of experience considered to comprise Block 2. Initially, simple (univariable) MANOVAs were conducted on each variable in each block in turn. Using liberal criteria, any variable from Block 1 found to exhibit some substantive association with IAD domain scores was carried forward into a multiple analysis of all Block 1 variables. Any Block-1 variable exhibiting a substantive association in the presence of others was carried forward for consideration alongside Block 2 variables, which were analyzed in the same way. Follow-up univariate ANOVAs were conducted on the final model to identify sources of any significant variation.

Subsidiary MANOVA procedures were undertaken on fully qualified practitioners only (i.e. excluding all students), using the same set of predictor variables included in the main model in the final analysis. An alpha value of 0.05 was set for all analyses excluding univariable screening procedures.

Results

A total of 433 health professionals were invited to participate. Five declined to participate and 428 completed the survey giving a response rate of 98.8%. Demographic data are presented in Table 1.

TABLE 1 HERE

Over half of the sample were registered nurses (52.8%). Years of experience varied across disciplines, ranging from less than a year to 40 years' experience. Senior registered nurses had the greatest levels of experience (mean 12.7 years); with the shortest being 1.42 years on average for undergraduate student nurses. Allied health practitioners had 7.98 years of experience on average, and doctors had 2.63 years of experience on average.

The majority of respondents were based in acute geriatrics, general medical or sub-acute & rehabilitation medicine wards. Role type was not recorded in 13 cases (3.0% of all cases). Years of experience was not recorded in 37 cases (8.6% of cases).

Mean scores in the etiology and risk and prevention and management domains, and in the total scale score, were above 50%; mean scores in the classification and diagnosis domain were slightly below 50%. The full range of possible scores was observed in each domain, and in the total scale score. The sample is summarized in Table 2.

TABLE 2 HERE

On the etiology and risk domain, 363 respondents (84.8%) obtained a score of 70% or more correct responses; considered to represent an acceptable score. The corresponding proportion of respondents achieving 70% or more in the classification and diagnosis and prevention and management domains was substantially lower, with only 68 respondents (15.9%) achieving 70% or more correct responses for the classification and diagnosis domain; and 87 respondents (20.3%) achieving 70% or more correct responses for the prevention and management domain. Overall, only 135 respondents (31.5%) achieved 70% or more correct responses for the entire set of items.

Some diversity in the proportion of correct responses to individual items was observed, particularly in the etiology and risk domain. In this domain, proportions of correct responses

to individual items ranged from 97.4% (*Risk factors for development of IAD are compromised mobility and inability to perform personal hygiene*) to 32.5% (*Using water and soap to cleanse the skin after episodes of incontinence will reduce the skin pH and will lower the risk for IAD development.*). Most items in this domain were correctly answered by a clear majority of respondents. In the classification and diagnosis domain, responses ranged from 78.6% correct (*In over 60% of clinical observations, IAD is mistakenly diagnosed as a pressure injury or vice versa*) to 9.2% correct (*this picture (supplied to participants) can be classified as IAD category 1B - Persistent redness with clinical signs of infection*). In the prevention and management domain, responses ranged from 85.9% correct (*Management of IAD in this picture should comprise of: A skin cleanser, moisturiser, protectant/barrier and in cases such as candida infection (thrush), a microbiology sample to decide on other appropriate therapy*) to 33.6% correct (*Hospitalised patients experiencing incontinence should have a systematic skin inspection performed every 48 hours*).

Simple MANOVAs revealed that ward type was not statistically or substantively related to a combination of the IAD domain scores. Using *Nurse* as a reference category, both the role types of *Allied Health Practitioner/Doctor*, and *Student*; and the numerical variable *Years of experience* were all statistically related to a combination of the IAD domain scores in both simple and multiple models. The model comprising these Block 2 variables thus became the final model.

Collectively, nurses had significantly better knowledge on a combination of domain scores than either allied health practitioners or doctors; and students (Table 3). Students scored lowest in all domains. Scores in all domains increased up to 15 years of experience. Beyond this level of experience, etiology and risk scores continued to rise while other domain scores fell slightly (Table 4).

TABLE 3 HERE

A cross-tabulation of scores by age and profession revealed that doctors scored higher than nurses in the etiology and risk domain regardless of years of experience and allied health practitioners who had 10 to 15 years of experience scored higher than doctors and nurses (Table 5).

INSERT TABLE 4 HERE

INSERT TABLE 5 HERE

Multivariate model parameters for the final model are summarized in Table 6 below.

INSERT TABLE 6 HERE

Hence, while there was very strong evidence that both role and years of experience were significantly associated with a linear combination of survey domain scores, role could be seen to have the greater substantive effect.

Discussion

This study examined the knowledge of clinicians concerning IAD assessment, prevention and management as part of a multicentre, multimethod translational research study across three wards at each of six hospitals in five health districts in one state in Australia. The results demonstrate that, overall, the clinicians in this study had low knowledge of IAD classification and diagnosis; prevention and management domains (total 62.1% correct: 78.6% on etiology and risk; 45.4% on classification and diagnosis; 56.8% on prevention and management).

Overall, the clinicians' knowledge of IAD was found to be below the minimum acceptable level of 70%.

The introduction of the guidelines³ has been innovative and greatly influential in developing the current understanding of IAD. However, the uptake of these guidelines by health facilities and organisations has been limited and very few studies internationally have implemented all

components of the guidelines to reduce IAD rates.²⁵ This could be influencing the low level of knowledge. IAD is a clinical condition requiring improvements to practice to minimize and reduce harm, as well as greater attention from, and prioritisation by, clinicians at the bedside. Updating and educating clinicians on current best practice evidence-based guidelines for IAD prevention is important.

Another reason for low knowledge levels found in this study is that IAD may be difficult to diagnose and differentiate from other skin conditions. Several studies have reported the difficulty clinicians have with differentiating IAD from other skin conditions, particularly PIs.²⁶⁻²⁸ Misdiagnosis of IAD as a PI has potentially serious implication leading to incorrect or delayed management and increases to the cost of care, such as longer lengths of stay and extra labour cost. An Australian study identified that a range of skin conditions were mistaken as PI in 190 instances, with approximately 80% of these misdiagnosed skin conditions found to be related to moisture-associated skin damage located on either the sacrum or the buttock.²⁶ Given that IAD is characterized by erythema of the skin around the buttocks, perineum and gluteal clefts, it is often mistaken for a PI.²⁹ Further, misdiagnosis of IAD as PIs can result in an increased hospital stay and increased organisational costs.^{30,31} Thus, ensuring clinicians can recognise and diagnose IAD early is vital to ensuring this condition is managed efficiently and effectively and decrease unnecessary costs of care.

In the present study, the mean scores of all domains of IAD knowledge did not vary significantly between the different hospital sites. The mean scores of the respondents in each participating hospital were within 8.7 percentage points of each other on the etiology and risk domain, within 15.8 percentage points of each other on the classification and diagnosis domain, and within 8.7 percentage points of each other on the prevention and management domain. The mean values of the total scores of all items at each hospital were within 7.3

percentage points of each other. This means that all groups of participants in this survey possessed and worked in an environment where knowledge level of IAD did not differ greatly.

As might be expected, nurses demonstrated significantly higher levels of knowledge on a combination of domain scores than allied health practitioners, doctors and students (both allied health and nursing). This finding may be attributed to nurses' everyday engagement in skin integrity assessment and management. Skin integrity care is an essential element of nursing care. Another explanation could be the recent introduction of nation-wide financial disincentives for hospital-acquired complications including for PIs. A focus on avoiding potential financial penalties may create an environment where skin integrity is viewed as an important focus of hospital care, leading to increased attention on IAD.³²

Interestingly, while nurses had a higher level of IAD knowledge in all domains, the allied health practitioners and doctors scored similar to nurses in the etiology and risk domain, and to a lesser extent, in the classification and diagnosis domain. Our study demonstrated that the more experience a clinician had, that is up to 15 years, the better their knowledge of IAD was. Interestingly, there was no discernible increase in knowledge beyond 15 years.

Acknowledging that the number of respondents with over 15 years clinical experience in our study was small, a possible reason for this finding may be that staff become complacent about their knowledge, or less willing to learn new skills, after a certain amount of clinical time.

For overall IAD knowledge, participants in this study compared favourably with the participants in Sahin et al.'s study,¹⁸ who scored 56% in their IAD knowledge survey (mean 33.05 correct responses of a maximum of 59; SD 10.2), which is slightly lower than the mean knowledge score of 62.1% in our survey. In line with the findings of Sahin et al. (2019),¹⁸ the participants in this study, overall, also had a low level of knowledge of IAD. Although the

ability to engage in a precise comparison of our results with those of Sahin et al. is restricted given the different sample sizes (126 compared to 428); different participant groups; and different items, their findings were broadly similar. For example, Sahin et al. found that most of the surveyed nurses had difficulty classifying IAD using the Ghent Global IAD Categorisation Tool. This was similar to our findings in that the mean scores (below 50%) in the classification and diagnosis domain were the lowest of all the domains. Interestingly, the question that yielded one of the lowest scores in our study was question 9: *'This picture [picture supplied] can be classified as IAD category 1B—Persistent redness with clinical signs of infection'*. Although we acknowledge that diagnosis from a color photograph without a patient history is difficult, a possible explanation for this low score is that, until recently, there has been little standardisation of the categorisation of IAD. Although IAD categorisation systems have been documented in the literature, with some validated and others combined with skin assessment tools, most have not been utilized to their full potential in clinical practice. In response to the low level of uptake of categorisations systems in clinical settings, Beeckman et al. (2017)³³ modified previously published IAD categorisation systems to create distinct classifications. This culminated in the Ghent Global IAD Categorisation Tool (GLOBIAD) which was published in 2017 to assist clinicians with diagnosing and assessing IAD.³³ Despite this new tool and IAD guidelines,³ our study found clinicians remain unfamiliar with the classification of IAD concerning severity and skin erosion.

Clinicians have limited knowledge concerning classification, diagnosis, prevention and management of IAD. It is prudent for organisations to address the knowledge gaps and educational needs in relation to IAD to ensure that clinicians are equipped with the requisite knowledge to prevent, correctly diagnose, and manage IAD in accordance with best practice guidelines. It is also important to consider that implementation of such programs and policies

may be influenced by staff shortages, lack of time and resources, competing clinical priorities and ward culture. The implementation of measures to ensure accurate IAD diagnosis and management should be accomplished through a well-considered process²⁵ to ensure that successful and sustainable practices are achieved. The findings of our study will inform the next steps of the overall project this study is embedded within, which is translating evidence into practice and targeted areas of clinicians' educational needs in relation to IAD. This survey will be repeated in the last phase of this multisite study to compare clinician knowledge following the implementation of best evidence.¹⁷

Strength and Limitations

The strength of this study is that it is the first to report a multidisciplinary group of clinicians' level of knowledge of IAD across multiple sites using a validated survey tool (KnowIAD)²¹ Other important strengths include a large sample size (n = 428) and a very high response rate (98.8%) negating risk of response bias or other sources of bias.

This study is limited by the cross-sectional design where we have sampled a snapshot of a group of clinicians at a certain time point. Therefore, caution must be exercised in the interpretation of observed associations between clinicians' disciplines or experience and levels of knowledge of IAD. However, this design has provided an estimate of clinicians' knowledge level; an important starting or reference point on which to base further interventional studies. Further, in order to maintain respondent anonymity, we collected limited data on participant demographics. We acknowledge that this may have reduced our understanding of further confounding factors contributing to low IAD knowledge levels.

Conclusion

This study adds to the literature by quantifying the gaps in understanding about IAD as a condition among Australian clinicians. Currently, clinicians tend to have low knowledge and recognition of IAD, particularly in the areas of classification and diagnosis, as well as

prevention and management. However, knowledge of IAD etiology and risk was largely proficient in the study participants. This suggests that the clinicians may have a sufficient grasp of how IAD is caused and the risk factors, but lack knowledge of how to prevent, recognise, and treat IAD. This study has used the KnowIAD tool to great effect to identify knowledge gaps for further education and improvement.

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