

Development of a Need-based Interventional Skin Care Protocol on Incontinence-associated Dermatitis among Critically Ill Patients

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ABSTRACT

Background: Incontinence-associated dermatitis (IAD) is a potentially serious skin injury that can lead to pressure ulcers (PUs). Many studies have indicated the need for evidence to find the most effective skin care protocol to reduce the incidence and severity of IAD in critically ill patients.

Aim and objective: To develop a need-based interventional skin care protocol on IAD after identifying the risk of developing IAD in critically ill patients and by assessing the nurse's knowledge and practice on IAD.

Materials and methods: Quantitative research approach with an exploratory research design was adopted in the study. A total of 40 staff nurses and 100 patients were included. To assess the knowledge of staff nurses regarding IAD, a knowledge questionnaire was administered and the IAD prevention practice among staff nurses was assessed with the help of an observation checklist. The risk of IAD among 100 critically ill patients was observed by the investigator, using a perineal risk assessment tool. The obtained data were analyzed by using descriptive and inferential statistics. The protocol was developed by the researcher and it was validated by 5 experts.

Results: The results revealed that most of patients (60%) had a high risk for development of IAD. Most of the nurses had poor knowledge (40%) and had poor practice in assessment, perineal area, and prevention of infection area. Hence considering all these aspects, a protocol was developed.

Conclusion: The researchers developed a need-based skin care protocol to decrease the development of IAD.

Keywords: Critically ill patients, Incontinence-associated dermatitis (IAD), Need-based interventional skin care protocol.

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INTRODUCTION

Incontinence is characterized by an uncontrolled loss of urine as well as stool/feces at an inappropriate time or in an inappropriate place. Incontinence is not an illness; however, it may be a side effect of a hidden disorder.¹

Incontinence can range from a steady or discontinuous spilling of a small amount of urine to an infrequent and uncontrolled release of vast volumes of body waste. Although incontinence is not thought to be part of a typical maturing process, age-related changes are the predisposing factors and do make incontinence more probable in older people. Different conditions that can cause incontinence are spinal cord injuries, dementia, birth defects, and childbearing.¹

Incontinence-associated dermatitis (IAD) is an inflammatory skin condition that happens when the skin is presented to urine or stool and leads to a secondary infection, pain, and skin sores. IAD incidence rates fluctuate from 5.6 to 50%, and the prevalence rates differ from 3.4 to 25%. Incontinence usually has many causes, is not completely understood, and includes psychological and physiological components.²

Recent evidence indicates that approximately 20% of acute care patients are incontinent and that 42.5% of incontinent patients have some type of a skin injury. Although the pathophysiology of IAD is not completely understood, disturbance of the skin's acid mantle as a protective barrier is thought to play a key role. It is a daily challenge for the health professionals in hospitals, nursing homes, and community care to maintain a healthy skin in patients with incontinence.²

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Urinary incontinence is a worldwide medical issue influencing 8.2% of the 2008 total population (4.3 billion).²

Fecal incontinence (FI) is thought to be very common, but much under-reported due to embarrassment.¹⁰ It affects people of all ages, but is more common in older adults (but it should not be considered a normal part of aging).¹¹ Females are more likely to develop it than males (63% of those with FI aged 30 may be females).¹⁰ In 2014, the National Center for Health Statistics reported that one of every six seniors in the United States who lived in their own home or apartment

had FI. Men and women were equally affected.⁹ And 45–50% of people with FI had severe physical and/or mental disabilities.¹⁰

MATERIALS AND METHODS

In this study, a quantitative research approach was adopted. Research design was an exploratory research design. The study was conducted in KS Hegde Hospital, Mangaluru. One hundred critically ill patients and 40 staff nurses of KS Hegde Hospital, Mangaluru, were included. Purposive sampling technique was used. For data collection, three tools were used. Perineal risk assessment tool was used to assess the risk of IAD among critically ill patients. Knowledge questionnaire and observation checklist were used to assess the knowledge and practice about IAD among staff nurses. Tool validity was done by 11 experts. To check the reliability, Cronbach's alpha method was used.

RESULTS

Section-1: Assessment of Risk of IAD among Patients

In this study, the risk of IAD was assessed for all of the 100 patients. The results revealed that 91% had soft stool with or without urine, followed by formed stool 7% and liquid stool with or without urine 2%. Most of the subjects (89%) had changed linen/pad at least every eight hours, 10% four hourly, and 1% two hourly. Of the study population, 48% had clear and intact skin; among the rest of the subjects, 40% had erythema/dermatitis with or without candidiasis and 12% had denuded/eroded skin with or without dermatitis, and 49% had three or more contributing factors (Table 1).

In this study, Figure 1 shows that among the 100 subjects, 60% had high risk and 40% had low risk of IAD.

Section-2: Assessment of Knowledge and Practice about IAD among Staff Nurses

In this study, among the 40 staff nurses, 80% was aware that the top layer of the epidermis is stratum corneum, 72.5% had knowledge that the pH of the skin is normally acidic, 67.5% had knowledge that IAD is caused due to exposure to friction, and 67.5% had knowledge

that IAD associated with FI tends to occur in the anal region and buttocks (Table 2A).

The knowledge score ranged between 3 and 17 with a mean of 9.05 ± 1.43 . All the 20 knowledge questions were assigned a value of either one for the correct answer or zero for the wrong answer. Then the total score had been obtained, and the scores were divided into three subgroups according to the level of perceived knowledge of the subjects. In this, concept of percentile method was used.

- P₁–P₃₃ as poor knowledge (3–8),
- P₃₄–P₆₇ as average knowledge (9–11),
- P₆₈–P₁₀₀ as good knowledge (12–17) (Fig. 2).

Figure 2 shows that among the 40 staff nurses, 40% had poor level of knowledge about IAD followed by 32.5% with average knowledge and 27.5% with good knowledge.

In this study, Table 2B shows that among the 40 staff nurses in the assessment area, majority performed handwashing, provided privacy to the patient, and maintained input–output chart. In the perineal area, majority were separating the legs of the patient and

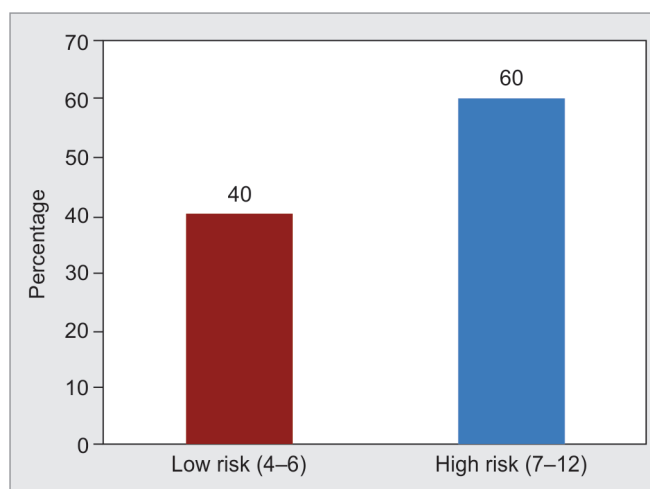


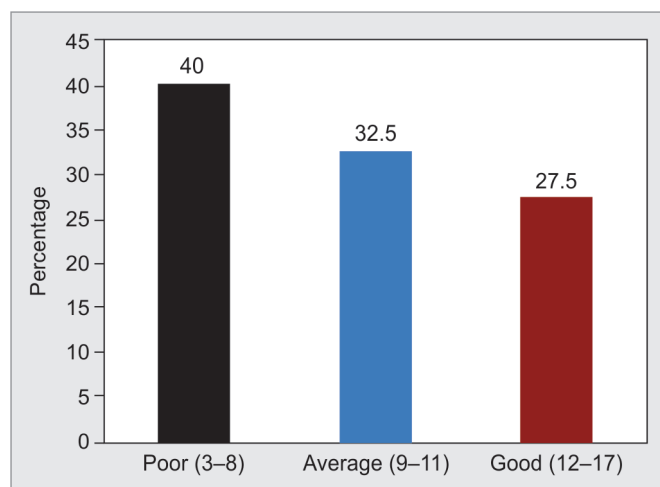
Fig. 1: Level of risk of IAD among subjects

Table 1: Assessment of risk of IAD among patients

IAD risk (n = 100)		Frequency
The intensity of irritant and type and consistency of irritant	Formed stool and/or urine	7
	Soft stool with or without urine	91
	Liquid stool with or without urine	2
Duration of irritant and amount of time that skin is exposed to the irritant	Linen/pad changes at least every 8 hours	89
	Linen/pad changes at least every 4 hours	10
	Linen/pad changes at least every 2 hours	1
Perineal skin condition and skin integrity	Clear and intact	48
	Erythema/dermatitis with or without candidiasis	40
	Denuded/eroded skin with or without dermatitis	12
Contributing factors: low albumin, antibiotics, tube feeding, or other	0–1 contributing factors	15
	2 contributing factors	36
	3 or more contributing factors	49

Table 2A: Assessment of knowledge about IAD among staff nurses

Knowledge (n = 40)	Frequency	Percentage
The top layer of the epidermis is the stratum corneum	32	80
The pH of the skin normally is acidic	29	72.5
The primary layer that serves as a protective barrier to shield internal tissues from exposure to toxins and bacteria is the stratum corneum	11	27.5
Which of the following is particularly harmful to the skin's barrier function? Fecal enzymes	14	35
Reported prevalence rates of IAD vary from 5.6 to 50%	19	47.5
Skin damage from incontinence is dependent on all of the above	19	47.5
Which of the following statements about urinary incontinence is not true? Men are more susceptible to IAD due to their anatomical structure	18	45
Which of the following is the most important risk factor for IAD in a patient with incontinence? Liquid stools	21	52.5
Incontinent women are more likely than men to develop IAD during bed rest because in females, urethra is short and much less supported than in males	20	50
Factors associated with the development of IAD include all except the use of tight clothing	8	20
IAD is caused due to exposure to friction	25	67.5
The major etiologic factors for IAD are exposure to urine and stool	20	50
IAD lesions are characterized as a wet-macerated appearance of skin along with. superficial erosion	17	42.5
IAD that is associated with fecal incontinence tends to occur in the anal region and buttocks	27	67.5
The typical pattern of IAD lesions are. bottom-up injuries	11	27.5
Which IAD assessment tool allows the clinician to match a patient's clinical presentation with the photographs for appropriate interventions? IAD intervention tool	9	22.5
The first line of defense for preventing IAD in an incontinent patient is identify and treat the causes of incontinence	16	40
Which of the following is not an effective prevention or management measure of IAD? Use of cotton clothes	12	30
Following an episode of incontinence, a structured skin-cleansing regimen should include gentle cleansing, moisturizing, and use of skin protectant	20	50
Which is a common complication of IAD? All of the above	13	32.5

**Fig. 2:** Level of knowledge about IAD among staff nurses

provided privacy to the patient; in the prevention of infection area, majority were changing indwelling catheters within seven days.

Section-3: Association between Baseline Knowledge and Practice with Selected Variables

In this study, to find the association between baseline knowledge score and demographic characteristics among staff nurses, Fisher exact and chi-square tests were used. The obtained 'p' values were >0.05 and hence there was no association between the demographic characteristics and the knowledge score at the 5% level of significance (Table 3A).

In this study, Table 3B revealed that Fisher exact test was used to find the association between the reported practices and the educational status of the staff nurses. The obtained 'p' value was <0.05 only for "item no. 12, 13, and 14." Hence, these practices were associated with the level of educational status, and for all other comparisons, the 'p' values were >0.05 and hence there was no association between those practices and the educational status.

Table 2B: Assessment of practice about IAD among nurses

Practice (n = 40)	Frequency	Percentage
Assessment		
1 Performs handwashing	40	100
2 Assesses the risk of IAD within four hours of admission (as evidenced by records)	27	67.5
3 Assesses the skin and risk of IAD thrice daily (as evidenced by records)	11	27.5
4 Maintains intake–output chart	40	100
5 Monitors weight daily (as evidenced by records)	4	10
6 Notes the volume and character of urine and records observations carefully	40	100
Perineal care		
1 Washes hands before and after procedure	40	100
2 Provides privacy to the patient	40	100
3 Separates the legs of the patient	40	100
4 Observes the perineal area	39	97.5
5 Cleanses the perineal area thoroughly	17	42.5
6 Cleanses the skin with a washcloth	20	50
7 Uses normal saline to clean the perineal area	14	35
8 Wipes from upside to downwards	5	12.5
9 Dries the skin properly	17	42.5
10 Documents the procedure	36	90
Prevention of infection		
1 Washes hands before and after procedure	40	100
2 Avoids skin wetness by keeping the area dry and clean	23	57.5
3 Replaces the dirty linens with clean ones	35	87.5
4 Uses clean washcloth every time	16	40
4 Changes diaper frequently as necessary	25	62.5
5 Reports any signs of infection promptly	39	97.5
6 Documents the procedure	37	92.5
7 Changes indwelling catheters within seven days	40	100

Table 3A: Association between baseline knowledge and demographic characteristics among staff nurses

Knowledge (n = 40)	Median		Statistical test	p' value
	≤10	>10		
Gender	Male	0	0.4 (Fisher exact)	0.4
	Female	24		
Educational status	Diploma	8	0.073 (Chi-square)	0.787
	Graduate	16		

Section-4: Association between Risk of IAD and Selected Variables

In this study, to find the association between the risk of IAD and the demographic characteristics among critically ill patients, likelihood ratio and chi-square test were used. If the obtained 'p' values were <0.05, then there was an association of age and educational status

with risk of IAD, and there was no association of gender, religion, and marital status with risk of IAD (Table 4)

DISCUSSION

Section-1: Assessment of Risk of IAD among Patients

In this study, the results revealed that most of the patients are at high risk of IAD. Ninety-one percent of them had a soft stool with or without urine. Majority of the subjects (89%) had changed linen/pad at least eight hourly. Forty-eight percent of the subjects had a clear and intact skin; 40% had erythema/dermatitis with or without candidiasis and the rest of the subjects (12%) had denuded/eroded skin with or without dermatitis, and 49% had three or more contributing factors.

According to the article published by "Mikel Gray," it explores that the risk of IAD or perineal skin damage is the greatest when the absorptive product becomes saturated with urine or when the skin remains occluded under a wet-absorptive product over an extended period of time.³

Table 3B: Association between practice and educational status among staff nurses

<i>n</i> = 40	Diploma		Graduate		Fisher exact test	' <i>p</i> ' value
	<i>f</i>	%	<i>F</i>	%		
Q3. Assesses the risk of IAD within four hours of admission (as evidenced by records)	9	22.5	18	45	0.0201	0.751
Q4. Assesses the skin and risk of IAD thrice daily (as evidenced by records)	3	7.5	8	20	0.0725	0.523
Q5. Avoids skin wetness by keeping the area dry and clean	11	27.5	12	30	0.189	0.48
Q7. Monitors weight daily (as evidenced by records)	2	5	2	5	0.3847	0.516
Q10. Observes the perineal area	14	35	25	62.5	0.0089	0.349
Q11. Cleanses the skin with a washcloth	7	17.5	13	32.5	0.0635	1.000
Q12. Wipes from upside to downside	4	10	1	2.5	0.1521	0.027*
Q13. Dries the skin properly	10	25	7	17.5	0.1557	0.007*
Q14. Uses clean washcloth every time	2	5	14	35	0.0007	0.015*
Q15. Replaces the dirty linens with clean ones	12	30	23	57.5	0.0533	0.804
Q16. Documents the procedure	14	35	22	55	0.0364	0.055
Q17. Changes diaper frequently as necessary	10	25	15	37.5	0.0938	0.392
Q19. Cleanses the perineal area thoroughly	6	15	11	27.5	0.087	0.973
Q20 Uses normal saline to clean the perineal area	5	12.5	9	22.5	0.1993	0.945
Q22. Reports any signs of infection promptly	14	35	25	62.5	0.0089	0.349
Q23. Documents the procedure	14	35	23	57.5	0.0239	0.099

*Indicates significantly

Table 4: Association between risk of IAD and demographic characteristics

IAD risk (<i>n</i> = 100)		Risk		Statistical test	' <i>p</i> ' value
		4–6	7–12		
Age (in years)	21–40	10	6	14.231 (Likelihood ratio)	0.003*
	41–60	24	25		
	61–80	6	27		
	>80	0	2		
Gender	Male	22	36	0.246 (Chi-square test)	0.620
	Female	18	24		
Educational status	No formal education	6	21	8.393 (Likelihood ratio)	0.039*
	Primary education	14	24		
	High school	16	11		
	PUC	4	4		
Religion	Hindu	35	44	3.619 (Likelihood ratio)	0.164
	Christian	1	6		
	Muslim	4	10		
Marital status	Married	34	43	4.75 (Likelihood ratio)	0.093
	Unmarried	3	3		
	Widow	3	14		

*Indicates significantly



Protocol for IAD Care In Hospital for critically Ill patient (Bed ridden Patients)			
Assessment of patient with urinary +1- fecal incontinence	Category	Sign & symptoms	Treatment
<p>Assess and document the perineal area skin daily in high risk and incontinent individuals with help of Perineal Risk Assessment Tool (PAT) & Incontinence-associated dermatitis and its severity (LADS) instrument tools.</p> 	<p>Category-0 Skin Condition- Intact Skin without redness in high risk patient)</p>	<p>Skin is Normal</p>	<p>Skin care: Cleanse, moisturize, and protect</p> <ul style="list-style-type: none"> • Select a pH-balanced skin cleanser (one whose pH range approximates the acid mantle of healthy skin). • Gentle cleansing with soft cloth. • Routine use of a moisturizer is recommended • To replace intercellular lipids • Promote moisture barrier function of the skin. • Avoid using diapers and adult briefs in bed. • Anti-inflammatory products should not be used for routine treatment of IAD. • Do not use antimicrobials for the routine treatment of IAD.
<p>Assess and document the perineal area skin daily in high risk and incontinent individuals with help of PAT & IADS tools.</p> 	<p>Category-1 (Skin condition: Intact skin with Mild erythema)</p>	<p>Presence of Redness with or without edema</p>	<p>Treatment, management & Prevention will be as per Category -0 along with following:</p> <ul style="list-style-type: none"> • Position the person semi prone to expose affected skin to air. • Antifungal products should be used only when a cutaneous fungal rash is present.

Fig. 3: Protocol on prevention and management of IAD.

Section-2: Assessment of Knowledge and Practice about IAD among Staff Nurses

This study stated that among the 40 staff nurses, 40% had a poor level of knowledge about IAD followed by 32.5% with average knowledge, and 27.5% with good knowledge.

A similar cross-sectional study was conducted in the year 2015 by “Abede and Daniel” taking 217 nurses, and this study revealed that majority (61%) of them had above-average level of knowledge about skin integrity maintenance practice.⁴

Results revealed that among the 40 participants, majority followed handwashing, provided privacy to the patient, maintained input-output chart, separated the legs of the patient, noted the volume and character of urine, recorded observations carefully, and changed indwelling catheters within seven days.

A supportive cohort study conducted from the year 2011–2015 by “Almunzer Zakaria” et al. taking more than 2000 hospital staff revealed that majority of the participants (94%) followed the handwashing techniques.⁵


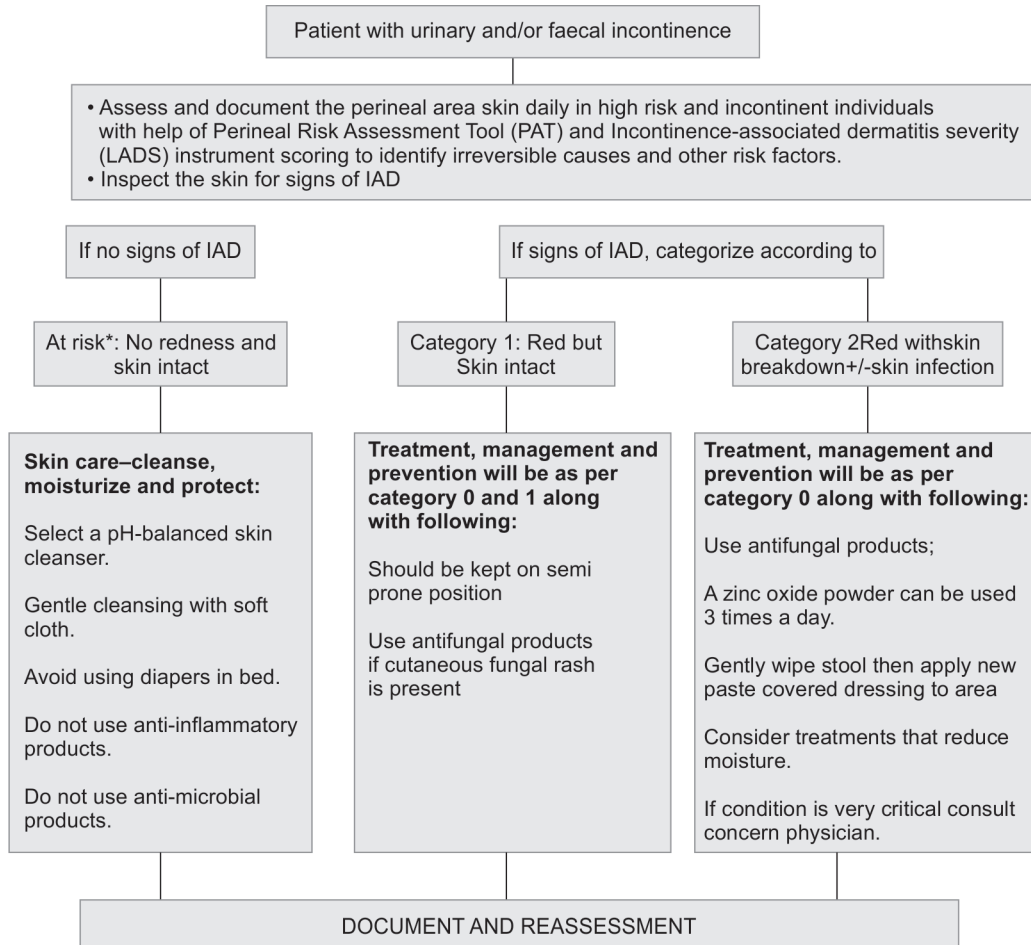
<p>Assess and document the perineal area skin daily in high risk/category 1 and incontinent individuals with help of PAT & IADS tools.</p> 	<p>Category-2 (Skin Condition-Redness with moderate to severe skin breakdown)</p>	<p>Erythema, Edema , Vesicles/ Bullae/Skin erosions, Skin denudation, infection</p>	<p>Treatment, management & Prevention will be as per Category — 0 & 1 along with following :</p> <ul style="list-style-type: none"> • Antifungal products should be used only when a cutaneous fungal rash is present. • Apply a zinc oxide-based powder for weepy or bleeding areas 3 times a day and whenever stooling occurs. • Do not scrub the zinc oxide paste completely off with the next cleaning. • Gently wipe stool, then apply new paste covered dressing to area • Position the person semi prone to expose affected skin to air. • Consider treatments that reduce moisture • Turning, astringents (calamine lotion). • If condition is very critical consult concern physician • If there is Skin infection then take a microbiological sample • Use that sample result to decide on appropriate therapy (e.g. antifungal cream, topical antibiotic, anti-inflammatory product)
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Fig. 4: Protocol on prevention and management of IAD.

Flowchart 1: Algorithm of prevention and management of IAD.



Section-3: Association between Baseline Knowledge and Practice with Selected Variables

In this study to find the association between the baseline knowledge score and demographic characteristics, Fisher exact and Chi-square tests were used. The obtained 'p' values were >0.05 and hence there was no association between the demographic characteristics and the knowledge score at the 5% level of significance.

A contradictory cross-sectional study is conducted by "Heidari and Shahbazi" taking 85 staff nurses. The study results explore that there is a significant association between knowledge and gender of nurses ($p < 0.05$).⁶

The Fisher exact test was used to find the association between the reported practices and educational status of the staff nurses. The obtained 'p' value was <0.05 only for items 12, 13, and 14. Hence, these practices were associated with the level of educational status; for all other comparisons, the 'p' values were >0.05 and hence there was no association between those practices and educational status.

According to a similar study which is conducted by "Lien et al." taking 339 hospital staff, it revealed that most of the study participants had good or adequate knowledge though the level of practice is not completely satisfactory.⁷

Section-4: Association between the Risk of IAD and Selected Variables

In this study to find the association between the risk of IAD and demographic characteristics, likelihood ratio and chi-square test were used. The obtained 'p' values were <0.05 and hence there was an association of age and educational status with risk of IAD, and there was no association of gender, religion, and marital status with risk of IAD.

A similar cohort study conducted by "Chianca et al." taking 157 critically ill patients has revealed that there is an association between age and the risk of IAD ($p < 0.015$). In this study, most of the IAD patients are males (85–54.1%) and age between 43 and 77 years.⁸

CONCLUSION

Based on literature review and study findings, a need-based protocol was developed as described in Figures 3 and 4 and Flowchart 1 which will help to prevent IAD and can be applied in intensive care units for patient care.

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