Assiut Scientific Nursing Journal
http://asnj.journals.ekb.eg
http://www.arabimpactfactor.com
http://olddrji.lbp.world/indexedJournals.aspx
DOI: 10.21608/ASNJ.2022.137334.1379

Effect of implementing healthy bed bath to reduce Skin complication among Critically Ill Patients

Asmaa Eid Abdlmsgeed Hussin[1], Mervat Anwar Abd EL-Aziz[2] &Asmaa Aly Mahgoub[3]
[1.] Nursing Specialist in Trauma Intensive Care Unit, Assiut University, Egypt.
[2.] Professor of Critical Care and Emergency Nursing Department, Faculty of Nursing, Assiut University, Egypt.
[3.] Assistant Professor of Critical Care and Emergency Nursing Department, Faculty of Nursing, Assiut University, Egypt.

Abstract
Background: healthy Bed bath is required to avoid skin complications among critical illness patients in the intensive care unit. **Aim of the study:** This study aimed to evaluate the effect of implementing healthy bed bath to reduce Skin complication among Critically Ill Patients. **Research design:** The present study is a quasi-experimental research design was conducted at three medical care units (critical care, general and intensive trauma care units) at Assiut University Hospital. **Method:** Data collected through a period of six months, from first of December 2020 to the end of May 2021on 60 patients who were selected by convenience sampling method and assigned into two equal groups Control group received traditional by bed bath using one towel and water with soap every day, while study group received healthy bed bath by using six wipes and water with chlorhexidine every 12 hours. Two tools were used in this study, **Tool I:** General assessment sheet, **Tool II:** Patients' outcomes evaluation sheet. **Results:** The current study showed that the control group had longer ICU stay and higher skin complications on the study group (25.67±13.49 versus 17.7±59) and lower Braden score compared to the study group (P<0.001). **Conclusion:** Skin nursing care by healthy bed bath using antimicrobial agents every 12 hours is extremely effective in reducing skin complications among ICU patients. **Recommendations:** Update the critical care nurses knowledge about different routes of skin care.

Keywords: Bed bath, Chlorhexidine, Complications, Critically ill, Patient's outcomes & Skin.

Introduction
Skin diseases in ICU patients have been proven in previous research to impair quality of life, length ICU stays, and increase death **(Badia et al., 2013; Cox, 2011; Emre et al., 2013; George et al., 2008; Wollina & Nowak, 2012)**. Simple measures such as regular skin cleansing by appropriate cleansing agents, and changing patients' position have been proved to protect patients' skin barrier. Also skin disorders can be caused by electrolyte disorders, organ failures, other comorbid conditions, adverse effects of medication, and infections induced by opportunistic pathogens **(Shen & Lu, 2010)**.

Various dermatological problems may develop in ICU patients as a result of primary pathologies, their complications, and complex treatment regimens used for therapy. Furthermore, immobility puts ICU patients at increased risk of decubitus ulcers and similar condition **(Kara et al., 2015).**

This bathing system claims to provide cleansing, nourish and moisturize to the skin while providing both maximum convenience and excellent skin care. These claims imply that using the product will help to maintain or improve skin quality, as well as possibly avoid subsequent issues from changes in skin integrity **(Johnson et al., 2009)**.

Several previous studied have been conducted to review care management in critical care to prioritize patient requirements, wellbeing, safety, and comfort. However; changes in blood pressure, desaturation, mechanical ventilation disconnection, changed heart rate, peripheral oxygen saturation, ventricular fibrillation, and cardiac arrest have all been reported as side effects. Therefore, nursing staff should guarantee that the patient's critical hygiene needs are satisfied not just at the expense of effective technique implementation, but also by considering nursing knowledge, adhering to policies, and treating all patients with dignity and respect **(Möller & Magalhães, 2015).**

The bed path has long been seen as a necessary and beneficial daily nursing intervention in giving sanitary care to patients. Traditional bed bathing (i.e., utilizing a basin, soap, water, washcloths, and towels) **(Cowdel et al., 2020)** may cause skin irritation. Skin dryness is one such effect that may have a negative impact on the skin quality of the elderly. **(Lawton, 2016).** A considerable percentage of the elderly population from 59% to 85% has dry skin that is less

protective. This puts the body at risk of serious illness **(Groven et al., 2017)**.

Chlorhexidine bathing represents a horizontal infection prevention approach that can potentially reduce dissemination of multiple pathogens. In addition, it is in theory a very simple and easy to implement intervention because it involves substitution of chlorhexidine bathing for standard soap-and-water bathing **(Evans et al., 2010).**

Chlorhexidine is a cationic bisbiguanide antiseptic that alters microbial membrane integrity **(Weinstein et al., 2008)**. A variety of formulations are available, with chlorhexidine gluconate being most commonly used in health care settings. Chlorhexidine has broad-spectrum activity against gram-positive and gram-negative bacteria, yeasts, and some lipid enveloped viruses. Potent sporicidal activity can be induced in chlorhexidine under altered physical and chemical conditions (e.g., elevated temperature, altered pH, and addition of ethanol **(Nerandzic & Donskey, 2015).**

Significance of the study

According to Assiut intensive care department records, there were 654 adult patients admitted to general, critical and trauma intensive care units at main University Hospital in 2020-2021. Cases were varying between one beds sore to four skin break down (Assiut university hospital records).

The incidence of dermatological disorders in patients in ICU has been reported to vary from 2.2% to 21.5% (Fischer et al., 2004). A recent Indian study of Gupta & Gupta, (2018) show that, the incidence of dermatological disorders was 18.31% among intensive care unit patients **(Gupta & Gupta, 2018)**.

Research hypothesis:

Skin complication among critically ill patient based on the procedure of bed bath and the materials .

Aim of the Study: to evaluate the Effect of implementing healthy bed bath to reduce Skin complication among critically Ill Patients.

Subjects and Methods:

Research design: The current study was a quasi-experimental research design.

Setting of the study: This study was carried out in three medical care units (critical, general, and trauma intensive care units) at Assiut University Hospital.

Sample: all patients were admitted to previous mentioned setting by convenience sampling methods and assigned into two equal groups (30 patients each) in the period from December 2020 to the end of May were included in this study.

- Control group: received traditional bed bath by using soap and water and have one towel every 24 hours.
- Study group: received healthy bed bath by using antimicrobial medication (2% chlorhexidin) and six wipes every 12 hours.

Study tools: Three tools were utilized to achieve the aim of the study:

Tool I: Patient assessment sheet:

This tool developed by the researcher after review of literatures to assess patient's condition and it include:

- **Part 1:** patient socio-demographics sheet: included patients' age, sex, marital status and occupation.
- **Part 2:** patient clinical data included: diagnosis, past medical diseases, risk factors, onset of complain in addition to medications.

Tool II: Patients' outcomes evaluation sheet: using Braden scale which consist of six categories; sensory perception, moisture, activity, mobility, nutrition, and friction or shear to reduce Skin complication among Critically Ill Patients **(Braden, 2012).**

Methods:

The study was conducted throughout the following phases:

Preparatory phase:

Seeking official and non-official permission to conduct the study were obtained by the researcher from the head of all intensive care units after explanation of aim and nature of the study.

Construction for data collection tools after extensive literature of review.

Content validity: The tools were tested for content related validity by jury of 5 specialists in the field of **Original Article Egyptian Journal of Health Care, 2020 EJHC vol.1** critical care nursing and critical care medicine from Assiut University then the tools were designed in their final format and tested for reliability using internal consistency for all of the tools which was measured using Cranach's test. The tools proved to be reliable (α 0.823).

A pilot study: was conducted on 10 patients to test the feasibility and applicability of the tools and the analysis of the pilot study revealed that minimal modifications are required, these necessary modifications were done and the pilot study subjects were excluded from the actual study.

Ethical consideration:

Research proposal was approved from Ethical Committee in the faculty of nursing. The study protocol was approved by Ethics Committee of the faculty of nursing:

- There was no risk for study subject during application of the study.
- The study followed common ethical principles in clinical research.
- Written consent was obtained from patients or guidance that participated in the study, after explaining the nature and purpose of the study.

- Patient was assured that the data of this research was not be reused without second permission.
- Confidentiality and anonymity was assured.
- Patients had the right to refuse to participate or withdraw from the study without any rational at any time.

Data collection:

The data were collected from the first day of admission after stabilization of the patient's condition and extended to 7 days, every day then the data were recorded in the developed tools.

Implementation phase:

- The socio-demographic and medical data were completed for all patients on admission as baseline data.
- Assessment of the two groups was done by using Braden scale.

In the study group the researcher Bed Bath With 2% Chlorhexidine

Preparation of the solution

- Obtain a bath basin and dispense 1/2 cup of 4% liquid chlorhexidine into basin.
- Add 1/2 cup of water (Do not dilute more than equal part of water to. The goal is to achieve 2%)
- Bring basin to bedside. Soak disposable wipes in basin. Wring each disposable wipe prior to application. Only soak and wring each disposable wipe once. DO NOT apply wipe to patient and place back in basin to rinse and apply again. Use each of the six wipes for bathing skin areas as instructed below. Ensure that wipes are applied to skin by firm massage to ensure the binding of liquid chlorhexidine to skin proteins. This allow liquid chlorhexidine s to continue to kill germs for a minimum of 24 hours.
  - **Wipe 1:** Face,* neck, and chest. Avoid eyes and ear canals.
  - **Wipe 2:** Both shoulders, arms, and hands
  - **Wipe 3:** Abdomen and then groin/perineum
  - **Wipe 4:** Right leg and foot
  - **Wipe 5:** Left leg and foot
  - **Wipe 6:** Back of neck, back, and then buttocks
- Decontaminate your hands and put on an apron.
- Fill a disposable bowl with warm water mixed with Chlorhexidine solution and ask the patient to check the temperature is comfortable.
- If the patient is wearing a watch, hearing aid or glasses, remove them.
- Place a towel under the patient's chin. Wash the face, neck and ears, checking whether the patient likes.
- Clean hearing aids and glasses if worn, and return them to the patient to facilitate communication during the procedure.
- Help the patient to remove their upper clothes and use a sheet to cover the patient. Only expose the part of the body that is being washed.
- Starting with the arm farthest away, wash and dry the upper body, including the arms, hands, axilla and torso.
- Moving across the body in this way ensures the washed area become dry by the end of the procedure **(Dougherty & Lister, 2015).**
- Always wash down the body, for example from axilla to hands.
- Ask the patient if they would like to soak their hands in water.
- Remove clothing from the lower body, then wash and dry the legs and feet, starting with the leg farthest away and working from the top of the leg to the foot.
- Change the water if required, apply non-sterile gloves before washing the patient's genitalia.
- If appropriate, ask the patient if they wish to wash their own genitalia, or gain consent to continue with the procedure.
- Female patients should be washed from front backward to reduce the risk of urinary tract infection.
- The foreskin in uncircumcised men should be drawn back and the skin underneath should be washed. Dispose of water and gloves if used.

In perineal care for male and female we must follow these procedures:

- **In male patient**
  - Hold shaft of penis and gently retract foreskin.
  - Using circular motion, wash tip of penis (using Chlorhexidine ointment, avoid getting it into meatus)
  - Repeat cleaning from meatus outward until clean; if needed, return foreskin to natural position.
  - Wash shaft and testicles. Pay attention to folds and groin area.
  - Rinse (if Chlorhexidine ointment used) and pat thoroughly dry (Note: remoistened wipes preferable).
  - Using separate cloth, wash lower abdomen or any other areas that may have been exposed to urine or feces.
  - Reposition resident to side-lying position, cleanse anal and buttocks area with toilet tissue if excess fecal matter.
  - Rinse (if soap used) and pat dry.
  - Apply barrier cream in thin layer to all skin-fold areas if recommended by facility protocol.
  - Make resident comfortable.

- **In Female care**
  - Help resident flex knees and widen legs (if not able, may keep straight) or turn resident on side with legs flexed.
  - Carefully wash one side of perineum at a time from front to back.
  - Repeat procedure using clean area on cloth or use a fresh cloth. Pay attention to folds and groin area.
  - Rinse (if soap used) and pat thoroughly dry (Note: pre-moistened wipes preferable)
  - Using separate cloth, wash lower abdomen or any other areas that may have been exposed to urine or feces.
  - Reposition resident to side-lying position, cleanse anal and buttocks area with toilet tissue if excess fecal matter.
  - Wash area from front to back.
  - Repeat if necessary with clean area on cloth or use a fresh cloth.
  - Rinse (if soap used) and pat dry.
  - Apply barrier cream in thin layer to all skin-fold areas if recommended by facility protocol.
  - Make resident comfortable.
  - Decontaminate your hands and fill a disposable bowl with warm water, checking the temperature again.
  - With help from a colleague (who has decontaminated their hands and put on an apron), roll the patient onto one side using appropriate equipment. Using a clean wash cloth and towel, wash and dry the back then the sacral area, moving from top to bottom.
  - Roll the patient back.
  - Change the lower sheet according to local procedures.
  - Help the patient to get dressed.
  - Check the patient's fingernails and toenails, and offer nail care if it is required.
  - Help the patient to clean their teeth and/or dentures, or assist them with mouth care following local procedures.
  - Comb or brush the patient's hair. Offer to help male patients with shaving if this is part of their normal routine.
  - Finish making the bed and ensure the patient is warm and comfortable with a call bell and a drink (if allowed). Ensure that their belongings are within reach.
  - Remove and dispose of aprons and decontaminate your hands.
  - Record the care that has been undertaken, along with any abnormal finding(s), and ensure you update the patient's care plan. Contact the tissue viability special concerns about the patient's skin.

In control group

The researcher performed traditional bed bath using one towel and water mixed with soap

Evaluation phase:

This phase was done to evaluate effect of implementing healthy bed bath in prevention skin complication among critical ill patient, length of stay and skin complications such as bed sore. Each patient was evaluated 8 times (from the admission to the last day of the study using tool II

Statistical Analysis: Data were computerized and analyzed by computer programmed SPSS (ver.16). Data were presented by using descriptive statistics in the form of frequencies and percentages or means ± standard deviations for qualitative data. Quantitative data were compared using Independent samples t-test for comparisons among two groups. Qualitative variables were compared using chi-square test to determine significance. The critical value of the tests "P" was considered statistically significant when P less than 0.05.

Results:

Table (1): Socio-demographic details between both studied groups (n=60)

		Control n=30)		Study(n=30)		P. value
		No	%	No	%	
Age group (years)						
< 44 year		18	60.0	11	36.7	0.189
45-54 years		2	6.7	6	20.0	
55-64 years		7	23.3	11	36.7	
65-74 years		3	10.0	2	6.7	
Mean ± SD		43.47±15.56		47.76±13.19		0.264
Sex						
Male		21	70.0	21	70.0	1.000
Female		9	30.0	9	30.0	
Cause						
Motor car accident		4	13.3	3	10.0	0.745
Fall from high		4	13.3	3	10.0	
Falling on ground		5	16.7	3	10.0	
train accident		4	13.3	5	16.7	
Fire arm injury		6	20.0	3	10.0	
heavy object trauma		4	13.3	6	20.0	
Stab wound		2	6.7	3	10.0	
machine injury		1	3.3	4	13.3	
Mechanism						
Penetrating		4	13.3	2	**6.7**	0.543
Blunt		19	63.3	18	60.0	
Penetrating & blunt		7	23.3	10	33.3	
ICU stay (days)		25.67±13.49		17.70±5.59		0.004**
Primary Diagnosis	**Respirator**y COPD	5	16.7	1	3.3	0.193
	Cardiovascular Hypertension	5	16.7	2	6.7	0.421
	C.N.S Stroke	5	16.7	1	3.3	0.193
	Endocrine Hypothyroidism	4	13.3	1	3.3	0.349

- Chi-square test - independent t-test

Table (2): Comparison between both studied groups in relation to perineal care for skin, injury, pain and urine or fecal incontinence during the study period (n=60)

Variables	Control (n=30)		Study (n=30)		P. value
	No.	%	No.	%	
On admission					
Swelling	0	0	0	0	-
Inflammation	0	0	0	0	-
Perineal tears	10	33.3	9	30	0.997
Rectal tear	12	40	15	50	0.603
Pain or discomfort	12	40	15	50	0.603
Urine incontinence	30	100	30	100	-
Fecal incontinence	30	100	30	100	-
1st day					
Swelling	0	0	0	0	-
Inflammation	0	0	0	0	-
Perineal tears	10	33.3	9	30	0.997
Rectal tear	12	40	15	50	0.603
Pain or discomfort	12	40	15	50	0.603
Urine incontinence	30	100	30	100	-
Fecal incontinence	19	63.3	17	56.7	0.796

Variables	Control (n=30)		Study (n=30)		P. value
	No.	%	No.	%	
2nd day					
Swelling	3	10	4	13.3	0.996
Inflammation	5	16.7	3	10	0.701
Perineal tears	10	33.3	9	30	0.997
Rectal tear	12	40	15	50	0.603
Pain or discomfort	12	40	10	33.3	0.786
Urine incontinence	26	86.7	20	63.3	0.072
Fecal incontinence	20	66.6	15	50	0.297
3rd day					
Swelling	12	40	5	16.7	0.086
Inflammation	15	50	5	16.7	0.013*
Perineal tears	10	33.3	9	30	0.997
Rectal tear	12	40	15	50	0.603
Pain or discomfort	12	40	15	50	0.603
Urine incontinence	26	86.7	20	63.3	0.072
Fecal incontinence	20	66.6	15	50	0.297
4th day					
Swelling	17	56.7	5	16.7	0.003**
Inflammation	16	53.3	5	16.7	0.006**
Perineal tears	10	33.3	9	30	0.997
Rectal tear	12	40	15	50	0.603
Pain or discomfort	17	56.7	6	20	0.007**
Urine incontinence	25	83.3	16	53.3	0.026*
Fecal incontinence	20	66.7	11	36.7	0.038*
5th day					
Swelling	17	56.7	5	16.7	0.003**
Inflammation	16	53.3	5	16.7	0.006**
Perineal tears	10	33.3	9	30	0.997
Rectal tear	12	40	15	50	0.603
Pain or discomfort	17	56.7	6	20	0.007**
Urine incontinence	25	83.3	16	53.3	0.026*
Fecal incontinence	20	66.7	11	36.7	0.038*
6th day					
Swelling	18	60	4	13.3	<0.001**
Inflammation	18	60	4	13.3	<0.001**
Perineal tears	10	33.3	9	30	0.997
Rectal tear	12	40	15	50	0.603
Pain or discomfort	19	63.3	10	33.3	0.038*
Urine incontinence	25	83.3	16	53.3	0.026*
Fecal incontinence	20	66.7	11	36.7	0.038*
7th day					
Swelling	20	66.6	4	13.3	<0.001**
Inflammation	20	66.6	4	13.3	<0.001**
Perineal tears	10	33.3	9	30	0.997
Rectal tear	12	40	15	50	0.603
Pain or discomfort	20	66.6	10	33.3	0.020*
Urine incontinence	25	83.3	16	53.3	0.026*
Fecal incontinence	20	66.7	10	33.3	0.019*

*Chi-square test. *Significant difference at p. value<0.05, **Significant difference at p. value<0.01*

Table (3): Comparison between both groups in relation to pressure sore assessment regard site, stage, tissue, color, odor, edges and exudates (n=60).

	Control (n=30)		Study (n=30)		P. value
	N	%	No	%	
Site					
Scapula	8	26.7	5	16.7	0.923
Shoulder	4	13.3	1	3.3	
Coccyx	5	16.7	2	6.7	
Sacrum	13	43.3	6	20.0	
Trochanter	7	23.3	2	6.7	
Heel	1	3.3	0	0.0	
Stage					
Non blanch able erythema	5	16.7	9	30.0	0.012*
Full thickness skin loss	12	40.0	3	10.0	
Full thickness skin loss with extensive destruction	4	13.3	0	0.0	
Tissue					
Epidermis or dermis	5	16.7	9	30.0	0.012*
Subcutaneous tissue	12	40.0	3	10.0	
Fascia or muscles	4	13.3	0	0.0	
Color					
Pink	4	13.3	9	30.0	0.013*
Red	12	40.0	3	10.0	
Yellow	4	13.3	0	0.0	
Black	1	3.3	0	0.0	
Exudates					
Mild	5	16.7	9	30.0	0.012*
Moderate	12	40.0	3	10.0	
Heavy	4	13.3	0	0.0	
Edges					
Round	7	23.3	11	36.7	0.004**
Irregular	14	46.7	1	3.3	
Odor					
Absent	7	23.3	11	36.7	0.004**
Present	14	46.7	1	3.3	

Chi-square test. **Significant difference at p. value<0.05,* ***Significant difference at p. value<0.01*

Table (4): Comparison between both groups in relation to Braden skin assessment (n=60)

Items	Control (n=30)	Study (n=30)	P. value
	Mean ±SD	Mean ±SD	
On admission	6.43±0.5	6.410.5	-
1st day	8.13±1.31	7.93±0.25	0.414
2nd day	9.37±3.53	9.36±3.51	-
3rd day	10.4±5.08	18.93±4.46	<0.001**
4th day	11.13±4.83	19.27±4.01	<0.001**
5th day	14.1±3.74	20.5±3.16	<0.001**
6th day	14.37±3.53	20.5±3.16	<0.001**
7th day	13.97±2.53	20.3±3.09	<0.001**

- Independent t-test **Significant difference at p. value<0.05, **Significant difference at p. value<0.01*

Table (1): Summarizes the socio-demographic data of the studied participants. No significance was observed between both studied groups except for the mean ICU stay (days) were patients in the study group have significantly shorter ICU stay as compared to the control group (25.67±13.49 vs

17.70±5.59, P=0.004) in both studied groups respectively.

Table (2): Shows that, from admission up to the 3rd day; no significance difference was observed between both studied groups regarding to all studied item (P>0.05, for all), except for the skin inflammation which was lower in the study group (15 (50%) vs 5 (16.7%), P=0.0130) respectively. In the 4th up to the 7th days of follow up; swelling, inflammation, pain or discomfort, urine and fecal incontinence were significantly lower in the study group (P<0.05, for all). Only perineal and/or rectal tear show no significant difference between both studied groups.

Table (3): Shows in no significance difference was observed between both studied groups regarding to the lesion site (P=0.923). Meanwhile all other pressure score parameters show significant improvement in patients of the study group compared to the control group (P<0.05, for all)

Table (4): Shows no significance difference between both groups regarding to the Braden skin assessment score from admission up to the 2nd day. Meanwhile from the 3rd to the 7th days of assessment; study groups have significantly higher Braden skin score compared to the control group (P<0.001, for all).

Discussion

In an intensive care unit, prolonged immobilization, malnutrition, impaired tissue perfusion, immune system dysfunction, fluctuations in body temperature, inadequate hygiene, hyperpyrexia, medications, and skin injuries may cause the disruption of the skin barrier function, which predispose the patients to a large number of dermatological disorders

It is known that skin diseases can markedly prolong the stay in ICU **(Gupta & Gupta, 2018).** In the current study we observed that the mean ICU stays (days) was significantly shorter in the study group compared to the control group The hospitalization period of patients in control was significantly longer than study group P<0 0.004**. In the previous study The rate of skin disorders increased with prolonged ICU stay.

Emre et al. (2013) reported that drug reactions occurred in 14.5% of patients staying at intensive care units. Were frictional bullae and allergic contact dermatitis. **Fischer et al. (2004)** reported a dermatitis rate of 49.4% in the same setting. **Kara et al. (2015)** reported that the most common skin disorders were stasis dermatitis (25%) and diaper dermatitis (25%). But in the current study the most common cause of skin infection were urine incontinence and fecal incontinence from the admission was (100%). In the seventh day, urine incontinence was (83,3%) but the fecal incontinence was (66.6%.).

The current study show no significance difference was observed between both studied groups regarding to perineal studied item (P>0.05, for all), except for the skin inflammation which was lower in the study group (15 (50%) vs. 5 (16.7%), P=0.0130) respectively. In the 4th up to the 7th days of follow up; swelling, inflammation, pain or discomfort, urine and fecal incontinence were significantly lower in the study group (P<0.05, for all). Only perineal and/or rectal tear show no significant difference between both studied groups.

In the current study mentioned that the most common sites of pressure sore among patient who were admitted trauma ICU were sacrum 43.3%, scapula were 26.6% and trochanter were 23.3%. Patients who had skin break down,5 (16.7%) had stage 1 pressure ulcers and 40% had stage 2. in 4 patients with stage 2 break down, the ulcers progressed to stage 3.

But show highly significance difference p <0.001** between both groups a t3rd day to 7th day. The study supported by **Pender & Frazier (2005)** mentioned that the Braden skin scale was poor discriminator when attempting to predict which subjects in this study were a 5t greatest risk for skin break down. The an Braden score on day of admission for all subjects was (6.43±0.5 -6.410.5) all of the subjects were identified at no risk by the Braden scale with highly significance [13.97±2.53 -20.3±3.09 <0.001**]. Which agree with **Fife et al. (2011)** study, Braden scores ranged from 8 to 23, indicating greater variability in score.

Regarding the risk factors of the studied patients who admitted Trauma Intensive Care Unit and General ICU unit at Assuit University Hospital that were high risk for pressure ulcer and risk factor were (immobility, hypoabuminemia, stroke, hypertension, reduced level of consciousness, fracture or major orthopedic and Decreased perfusion) were the most common with non-statically difference between both study and control groups. In the current study conscious level seems to be the most common associated risk factors in development of pressure ulcer with a percentage of (10.5±2.81 vs 14.9±3) at 7th day in both study and control groups respectively.

The researcher opinion firstly was healthy bed bath by using 4% chlorhexidine concentrated instead of using 2% chlorhexidine because this method may be more effective in decreased skin colonization with multi-drug resistant organisms (MDROs) decreased rates of bloodstream infections, and reduced Clostridium difficult infections.

Secondly the researcher opinion was healthy bed bath must be once every 24 instead of twice daily to protect multiple traumatized patient from discomfort and pain.

Bed baths are used to physically clean dirt and microorganisms from the skin of critically ill patients, thereby decreasing the risk of infection **(Jones, 2014; Schoonhoven et al., 2015)**. So it is necessary to remove body excess secretions, but without causing skin dryness, as we mentioned that intact skin serves as a first line of defense against invading microbes. On the other hand, dry skin is prone to cracking, which can in turn lead to an infection **(Lichterfeld-Kottner et al., 2018).**

Studies show that soap and water washing can have a direct impact on the epidermis by posing a number of threats to skin integrity and skin barrier function. Soap can remove the resident flora and the natural lipids, increase skin acidity, interfere with the water-holding capacity of the skin, thin the layers of the stratum corneum and decrease natural skin lubricants **(Deguchi et al., 2015; & Massa, 2010).**

During stay at intensive care unit, prolonged immobilization, malnutrition, impaired tissue perfusion, immune system dysfunction, increased edema, fluctuations in body temperature, inadequate hygiene, hyperpyrexia, medications, and skin injuries may cause the disruption of skin barrier, leading to skin disorders In our study, skin disorders that developed in ICU patients were associated with age **(Emre et al., 2013).**

The rate of skin disorders increased as ICU stay prolonged, and they were associated with increased mortality. The frequency of skin disorders increased in patients with COPD, CRF, and malignancy **(Badia et al., 2013).** There was no association between mortality and dermatological disorder subtypes. Candida infections tend to be located in body regions that are hardly ever kept clean and dry when patients are immobile (e.g. inguinal, axillary regions) **(Wollina & Nowak, 2012).**

In medically treated critically ill patients. Skin becomes more fragile and edematous as a result of aging, primary disorder, immobilization, co-morbidities, and medications used. When frequent friction is added on top of these structural alterations, frictional bullae develop. Anti-septic agents, especially chlorhexdine, medicated plasters, skin care creams, and monitoring electrodes are reportedly associated with allergic reactions. The incidence of seborrheic dermatitis is reportedly increased by neurological disorders such as Parkinson disease, facial paralysis, supraorbital injury, poliomyelitis, syringomyelia, epilepsy, quadriplegia, and unilateral injury **(Kara et al., 2015).**

Chlorhexidine is a broad-spectrum topical antimicrobial agent that, when used to bathe the skin, may decrease the bacterial burden thereby reducing infections. Several observational and quasi-experimental studies have found that daily bathing with chlorhexidine results in decreased skin colonization with multi-drug resistant organisms (MDROs) decreased rates of bloodstream infections, and reduced Clostridium difficile infections (CDI) **(Karki & Cheng, 2012).** A multicenter cluster-randomized trial demonstrated that bathing patients with chlorhexidine reduced MDRO acquisition and hospital-acquired bloodstream infections (HA-BSI**) (Climo et al., 2013)**, and chlorhexidine bathing is incorporated into some expert guidelines **(Calfee et al., 2014).**

Our study compared bathing using 2% chlorhexidine and six wipes or versus soap-and water bathing by using one towel.. Unfortunately; no previous studies assess the difference between both studied procedures, so we can't compare our finding with previous literatures. We recommend for a larger prospective randomized studies to confirm our finding and to provide decision for the most appropriate procedure for critical ill patients **(Evans et al., 2010).**

During the past decade, a number of studies have examined the use of chlorhexidine bathing as an infection prevention strategy. This review examines the evidence that chlorhexidine bathing can prevent colonization and infection with health care-associated pathogens and reduce dissemination to the environment and the hands of personnel **(Batra et al., 2010).**

Braden scale is based on the pathophysiology of the pressure ulcers, allows for the evaluation of important aspects for the formation of ulcers, according to six parameters: sensory perception, moisture, mobility and activity, nutrition, friction, and shear. The first five sub-scales have a score ranging from 1 to 4, while the scores of the friction and shear sub-scales range from 1 to 3. The sum of scores of each sub-scale ultimately allows stratification into groups, with lower values indicating worse conditions **(Braden, 2012).** In the present study we observed that from the 3rd to the 7th days of assessment; study groups have significantly higher Braden skin score compared to the control group.

The limitation of the study:

The authors noted that many of the patients in the unit had large, open abdominal wounds that could make chlorhexidine application difficult. In addition to providing feedback on compliance, measurement of chlorhexidine on skin in such real-world settings may shed light on some of the challenges involved in providing effective bathing **(Batra et al., 2010).**

Conclusion

Based on the results of this study, it could be concluded that healthy bed bath by using antimicrobial medication every 12 hours is extremely

effective in reducing complications and improving the skin status among ICU patients.

Recommendations:

- Emphasize the importance of applying healthy bed bath by using antimicrobial medication every 12 hours on reducing skin complications and duration of ICU stay among critical ill patients. This procedure should be used as standard skin nursing care for patients in the intensive care units.
- Update the critical care nurses knowledge about different routes of skin care.

References

- **Badia, M., Serviá, L., Casanova, J.M., Montserrat, N., Vilanova, J., Vicario, E., Rodriguez, A. & Trujillano, J. (2013):** Classification of dermatological disorders in critical care patients: a prospective observational study. Journal of critical care, 28(2), 220. e221-220. e228
- **Batra, R., Cooper, B.S., Whiteley, C., Patel, A.K., Wyncoll, D. & Edgeworth, J.D. (2010):** Efficacy and limitation of a chlorhexidine-based decolonization strategy in preventing transmission of methicillin-resistant Staphylococcus aureus in an intensive care unit. Clinical Infectious Diseases, 50(2), 210-217
- **Braden, B.J. (2012):** The Braden scale for predicting pressure sore risk: reflections after 25 years. Advances in Skin & Wound Care, 25(2), 61
- **Calfee, D.P., Salgado, C.D., Milstone, A.M., Harris, A.D., Kuhar, D.T., Moody, J., Aureden, K., Huang, S.S., Maragakis, L.L. & Yokoe, D.S. (2014):** Strategies to prevent methicillin-resistant Staphylococcus aureus transmission and infection in acute care hospitals: 2014 update. Infection Control & Hospital Epidemiology, 35(7), 772-796
- **Climo, M.W., Yokoe, D.S., Warren, D.K., Perl, T.M., Bolon, M., Herwaldt, L.A., Weinstein, R.A., Sepkowitz, K.A., Jernigan, J.A. & Sanogo, K. (2013):** Effect of daily chlorhexidine bathing on hospital-acquired infection. New England Journal of Medicine, 368(6), 533-542
- **Cowdell, F., Jadotte, Y.T., Ersser, S.J., Danby, S., Lawton, S., Roberts, A. & Dyson, J. (2020):** Hygiene and emollient interventions for maintaining skin integrity in older people in hospital and residential care settings. Cochrane Database of Systematic Reviews,(1)
- **Cox, J. (2011)** Predictors of pressure ulcers in adult critical care patients. American journal of critical care, 20(5), 364-375
- **Deguchi, H., Aoyama, R., Takahashi, H., Isobe, Y. & Tsutsumi, Y. (2015):** Harmful effects of synthetic surface-active detergents against atopic dermatitis. Case Reports in Dermatological Medicine, 2015
- **Dougherty, L. & Lister, S. (2015):** The Royal Marsden manual of clinical nursing procedures: John Wiley & Sons.
- **Emre, S., Emre, C., Akoglu, G., Demirseren, D.D. & Metin, A. (2013):** Evaluation of dermatological consultations of patients treated in intensive care unit. Dermatology, 226(1), 75-80
- **Evans, H.L., Dellit, T.H., Chan, J., Nathens, A.B., Maier, R.V. & Cuschieri, J. (2010):** Effect of chlorhexidine whole-body bathing on hospital-acquired infections among trauma patients. Archives of Surgery, 145(3), 240-246
- **Fife, C., Otto, G., Capsuto, E.G., Brandt, K., Lyssy, K., Murphy, K. & Short, C. (2011):** Incidence of pressure ulcers in a neurologic intensive care unit. Critical care medicine, 29(2), 283-290
- **Fischer, M., Soukup, J., Wohlrab, J., Radke, J. & Marsch, W. (2004):** Key dermatological symptoms in the intensive care unit. International journal of dermatology, 43(10), 780-782
- **George, S., Harrison, D.A., Welch, C.A., Nolan, K.M. & Friedmann, P.S. (2008):** Dermatological conditions in intensive care: a secondary analysis of the intensive care national audit & research centre (ICNARC) case mix programme database. Critical Care, 12(1), 1-10
- **Groven, F., Zwakhalen, S.M., Odekerken-Schröder, G., Joosten, E.J. & Hamers, J.P. (2017):** How does washing without water perform compared to the traditional bed bath: a systematic review. BMC geriatrics, 17(1), 1-16
- **Gupta, H. & Gupta, M. (2018):** Dermatological manifestations in the intensive care unit–A prospective study. skin, 9, 10
- **Johnson, D., Lineweaver, L. & Maze, L.M. (2009):** Patients' bath basins as potential sources of infection: a multicenter sampling study. American Journal of Critical Care, 18(1), 31-40
- **Jones, M.L. (2014):** Personal hygiene 3.4: Assisting with bathing. British Journal of Healthcare Assistants, 8(9), 439-440
- **Kara, A., Ortac, E., Hapa, A., Ocal, S. & Topeli, A. (2015):** Dermatological Problems and Dermatology Consultations in Intensive Care Units/Yogun Bakim Unitesinde Karsilasilan Dermatolojik Sorunlar ve Dermatoloji Konsultasyonu. Dahili ve Cerrahi Bilimler Yoğun Bakım Dergisi (Journal of Medical and Surgical Intensive Care Medicine), 6(1), 1-4
- **Karki, S. & Cheng, A. (2012):** Impact of non-rinse skin cleansing with chlorhexidine gluconate on prevention of healthcare-associated infections and colonization with multi-resistant organisms: a systematic review. Journal of Hospital Infection, 82(2), 71-84

- **Lawton, S. (2016):** Emollients and ageing skin: optimising effectiveness and safety. British journal of nursing (Mark Allen Publishing), 25(11), 596-598
- **Lichterfeld-Kottner, A., Lahmann, N., Blume-Peytavi, U., Mueller-Werdan, U. & Kottner, J. (2018):** Dry skin in home care: A representative prevalence study. Journal of tissue viability, 27(4), 226-231
- **Massa, J. (2010):** Improving efficiency, reducing infection, and enhancing experience. British Journal of Nursing, 19(22), 1408-1414
- **Möller, G. & Magalhães, A.M.M.d. (2015):** Bed baths: nursing staff workload and patient safety. Texto & Contexto-Enfermagem, 24(4), 1044-1052
- **Nerandzic, M.M. & Donskey, C.J. (2015):** Induced sporicidal activity of chlorhexidine against Clostridium difficile spores under altered physical and chemical conditions. PLoS One, 10(4), e0123809
- **Pender, L.R. & Frazier, S.K. (2005):** The relationship between dermal pressure ulcers, oxygenation and perfusion in mechanically ventilated patients. Intensive and critical care nursing, 21(1), 29-38
- **Schoonhoven, L., van Gaal, B.G., Teerenstra, S., Adang, E., van der Vleuten, C. & van Achterberg, T. (2015):** Cost-consequence analysis of "washing without water" for nursing home residents: a cluster randomized trial. International Journal of Nursing Studies, 52(1), 112-120
- **Shen, H.-N. & Lu, C.-L. (2010):** Skin and soft tissue infections in hospitalized and critically ill patients: a nationwide population-based study. BMC infectious diseases, 10(1), 1-8
- **Weinstein, R.A., Milstone, A.M., Passaretti, C.L. & Perl, T.M. (2008):** Chlorhexidine: expanding the armamentarium for infection control and prevention. Clinical Infectious Diseases, 46(2), 274-281
- **Wollina, U. & Nowak, A. (2012):** Dermatology in the intensive care unit. Our Dermatology Online, 3(4), 298