

Maximizing Result of Bedsore Prevention in Mechanical Ventilated Patient

Abeer Al Ghafri¹, Asad Al Ghafri² and Mohammed Abdullah Al Shuhoumi^{3, 4, 5*}

¹Senior Nurse, COVID-19 department in-charge, Ibri Regional Hospital, Oman

²Center of studies and research (CSR), DGHS, Oman

³Medical laboratory Scientist and Research focal point, Ibri Hospital, Laboratory Department, Oman

⁴Academic lecturer, Oman College of Health Sciences, Oman

⁵Reviewer and member at Centre of Studies and Research (CSR), Oman

*Corresponding Author

Mohammed Abdullah Al Shuhoumi, Medical laboratory Scientist and Research focal point, Ibri Hospital, Laboratory Department, Oman.

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Abstract

Objectives: According to the Clinical Practice Guideline (CPG), there are several preventive interventions for Pressure ulcers, including a thorough initial examination during admission to identify risk factors, education about PUs, repositioning, and nutritional support. Hydrocolloid dressings have been used to prevent bed sores in several places, although there has not been much research. The study sought to determine the relationship between hydrocolloid dressing and the prevention of bedsores among ventilated patients.

Method: an observational retrospective study that included patients on mechanical ventilators. Participants were selected from the covid ward in the Ibri hospital population. Pretest and post-test investigations were done using conventional or conventional care with preventive hydrocolloid dressing. Information was obtained from staff recordings and assessments in AlShifa 3 plus program.

Result: Seventy-four patients were included in the study. Forty patients were included in the pretest, using conventional care only, and 34 patients were included in the post-test, using conventional treatment and hydrocolloid dressing. A decrease in the number of occurrences of bedsores from 22 (55%) at the pretest to 5 (15%) at the post-test. Most bedsores stage occurs in the post-test was stage one (4 out of 34) and was mainly related to patients with comorbidities.

Conclusion: The study findings reveal a significant difference between the post-test and PUS variable of using CC+HD (p -value - $0.000 < 0.05$), reducing harm to the patients. It is necessary to promote trials that lead to comparing different preventive measures.

Keywords: Pressure Ulcer, Hydrocolloid Dressing, Mechanical Ventilator, Bedsore Prevention.

1. Introduction

Pressure ulcers (PUs) or bedsores defined as a skin damages or tears that occur due to a compression of soft tissue which located between the bony protrusion and the outer surface for long period of time [1]. According to the study by Doozandeh in 2020, there

are four different stages of PUs which describes the degree of skin damage including, non-blanchable erythema of intact skin, partial-thickness skin loss with exposed dermis, full-thickness skin loss and full-thickness skin and tissue loss [2]. The global prevalence of bedsores ranges from 9% to 53%. Hospital acquired pressure

sore reported a percentage of 42% in intensive care units (ICUs) with a cost around 48,000 US dollars [3].

According to the latest statistics of WHO, about 60000 patients die from the different complication of PUs around the world every year [4]. In addition, PUs emerged to be the most common complication for sedated, ventilated, or bedridden patients who are admitted in the hospitals for long time [5]. Increase occurrence of bedsore in clinical area, might happen because of different factors for example obesity, and fever. However, it might be also an indicator of the nursing care allocations.

Pressure ulcer leads to negative effects on patients, patients' families, healthcare workers leading to increased risk of nosocomial infection, pain, disability, and prolonged hospitalization, which ultimately increases the rates of morbidity and mortality [6-10]. Thus, prevention from PUs remains a significant challenge for health care workers especially long-term health providing facilities. According to the Clinical Practice Guideline (CPG) there are various preventive measures for PUs, which are appropriate initial assessment while admission and determine the risk factors, knowledge about PUs, repositioning, and nutritional support [11].

Multiple studies and research with different results has been conducted around the world to investigate the best way to prevent pressure ulcer. A review released in 2013 noted that there was a paucity of high-quality evidence supporting the use of dressings for the prevention of pressure ulcers. The review involved four trails of 561 patients in a focus to examine the potential role of dressings in the preventing pressure ulcers on the utilization of dressings over bony prominences and showed a reduced pressure ulcer incidence with a risk ratio of 0.21 (95% confidence interval 0.09–0.51; P-value 0.0006) [12]. In Arab countries, researchers did not focus much in investigating various solutions as a prevention of bed sore. According to a study conducted in Saudi Arabia in 2012 asserted the effectiveness of prevention and management of pressure ulcer as a patient safety issue among bed-ridden population. The study showed zero compliance by nurses in performing a comprehensive skin assessment is which should be performed within 24 hours of admission as a providing care for high-risk patients. In addition, 80.8% high risk patient given the same care but after patients have bed sore and there are significant differences was noticed [13].

Given uncertainty to describe the preventive measures that can be used for pressure ulcers instead of treating it and spending a lot of the hospital budget, the aim of the current is to determine the relationship between hydrocolloid dressing and prevention of bedsores among ventilated patients evaluated by pre and post-test, using conventional care or conventional care with preventive hydrocolloid dressing respectively through observational retrospective study.

2. Methods

2.1 Setting and Study Population

The study was conducted at Ibri regional hospital (IRH). According

to the hierarchy of health service allocations, IRH is a secondary medical institution [14]. It provides services to 165,664 citizens. Based on the Omani department of health and information and statistics released in 2020, the average length of stay (LOS) at IRH is 2.7 days, while the average turns over interval (TOI) is 3.9 days. There are 260 beds available with various specialties.

Of note, the study focuses on in-patients admitted in the COVID-19 ward. 74 patients were included in the study between November 2020 and November 2021. The demographic characteristics of the study population were not limited to a particular gender or an age; all were included. Table 1 illustrates different age groups, genders, PU stages, with or without comorbidities (comorbidities defined in our study as any disease or disorder or underlying pathology that co-exist with the current state of the patients being admitted particularly for COVID-19 infections), site of bedsore, type of intervention, hospitalization period, and the utility of Braden scale.

2.2 Study Design

Retrospective observational study was conducted for one year comprising 74 COVID-19 patients. Clinical quantitative data were obtained from the health setting adopted system at the Omani ministry of health (AL-Shifa 3 Plus). The data include demographic characteristics, PU stages, with or without, site of bedsore, type of intervention, hospitalization period, and the utility of Braden scale.

2.3 Pre-Test and Post-Test Evaluation

In order to assess the efficacy of the intervention, the patients have been allocated into two groups; pre-test and post-test.

Pre-test group (n=40) includes several criteria: being ventilated patients, from all nationality, any body mass index, admitted in the period between November 2020 and May 2021 and did not receive the intervention of interest (conventional dressing and/or hydrocolloid dressing). In the other hand, the criteria of post-test group (n=34) were focused in ventilated patients, from all nationality, any body mass index, admitted in the period between May 2021 and November 2021 and were subjected receive conventional dressing and/or hydrocolloid dressing.

2.4 Statistical Analyses

The variables were pre-determined and evaluated by using descriptive statistical analyses. Central tendencies were conducted to analyze the data. Chi-2 or Fisher Exact test was utilized. A p value of less than 0.005 was determined to state a statistical significance difference. The descriptive analyses conducted using Statistical Package for Social Sciences (SPSS) (IBM SPSS statistics version 21).

2.5 Ethics

The study was conducted in compliance to the 1964 Helsinki declaration. The current study granted approval by the Omani research and ethical review and approve committee (RERAC).

3. Results

Of the total number of patients included (n=74), 34 received the

hydrocolloid dressing with conservative care preventive treatment and 40 were administered only conservative care. It was generally observed that the groups differ in the number of patients, Ages and gender. There was a decrease in the number of occurrences of bedsores from 22 (55%) at pretest to 5 (15%) at posttest which represent 40% of total decreasing (Table 1). Although, there was a reduction of bedsores occurrence after using HD+ conservative, patient had a stage 1 and stage 2 bed sore.

There was a significant difference in long hospitalization, usage of HD, comorbidities, usage of Braden scale and Age with the occurrence of bedsores. In relation to Age group, a higher

prevention of bedsores was noted in the patient aged from 66 – 79 of age using the HD + conservative treatment compared to other age groups with the same intervention (23% versus 18%). According to comorbidities, there was a significant difference between comorbidities and occurrence of bedsores with p-value (0.000<0.05). In both factors affecting bedsores, stated as, staying more than 16 days (prolong hospitalization) and usage of Braden scale with occurrence of bedsores, there was a significant difference between both factors and occurrence of bedsores with p-value (0.001<0.05). Chi-square used to examine the association between using the HD+ preventive measures and the occurrence of bedsores, showing significant difference between both. (Table 2).

Variables		Occurrence of Bedsores					
		No		Yes		Decreasing Change%	
		Pretest Count	Post-test Count	Pretest Count	Post-test Count		
Gender	Female	8	6	9	3	14%	
	Male	10	23	13	2	27%	
Age Group	25-65	11	19	9	4	11%	
	66-79	3	9	9	0	23%	
	80-99	4	1	4	1	7%	
Occurrence of bedsores		18	29	0	0	0%	
	Ear	0	0	1	0	3%	
	Sacral	0	0	17	5	28%	
	others	0	0	3	0	8%	
Stage	Shoulder	0	0	1	0	3%	
	NA	18	29	0	0	0%	
	Stage 1	0	0	6	4	3%	
	Stage 2	0	0	13	1	30%	
Using of CC+HD	Stage 3-	0	0	3	0	8%	
	Yes	18	29	22	5	40%	
	Most comorbidities	No	7	8	2	1	2%
		Yes	11	21	20	4	38%
Hospitalization period	11 - 16 Days	3	10	2	2	1%	
	5 - 10 Days	6	4	1	0	3%	
	More than 16 Days	9	15	19	3	39%	
Using of Braden scale	Not used	10	8	7	0	18%	
	Used	8	21	15	5	23%	
Total	18	29	22	5	40%		

Table 1: Frequency table of Occurrence of bedsores with variables.

Statistical test	Value	Full form	Full form (2-sided)	Exact Significance (2-sided)	Exact Significance (1-sided)
Pearson Chi-Square	12.876a	1	.000		
Continuity Correction ^b	11.196	1	.001		
Likelihood Ratio	13.666	1	.000		
Fisher's Exact Test				.001	.000
Linear-by-Linear Association	12.702	1	.000		
N of Valid Cases	74				

a: 0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.41.

b: Computed only for a 2x2 table.

Table 2: Chi-Square Tests (Test*Bedsore)

4. Discussion

The findings from our study show a significant difference between using of hydrocolloid dressing with conservative treatment and occurrence of bedsores in adult and geriatric patients. When combining the strategy of prevention using hydrocolloid dressing with conservative treatment, the result was represented in a decline in the pressure ulcer occurrence by 40%, however, some patients had stage 1 and stage 2 bedsores which explain that patients cannot be prevented totally from bedsores as other factors did not permit the prevention process.

Different factors affecting the occurrence of bedsores, Age group can affect the occurrence of pressure ulcer, as skin integrity changed when becoming older, however, found that the ages from 66 – 79 get more benefited from the preventive measure, which can explain that younger people below the age of 66 can have a sensitive skin that can be damaged easily. Patients with comorbidities were more applicable to get pressure ulcer, as their hemodynamic status can be altered easily, which affect the blood circulation to the skin. Prolong stay in the hospital can promote the occurrence of bedsores, as those patients pond to bed, leading to increase the friction to bed mattress. In our study, found that staff when using Braden scale, patient was more prone to get pressure ulcer, which indicate lack of knowledge in regards actions to be taken when conducting Braden scale. Comparing to literature that was done in 2018 by Cortés et al it showed no significant difference between the use of preventive dressing with conservative treatment and development of bedsores, which is a contradictory finding with this study [15,16].

There are several limitations faced, for example, Staff adherence of applying hydrocolloid at the time of admission and the un proper documentation in the system describing the preventive application of dressing. Another limitation was that the data did not clarify whether the PU was incurred in the hospital or in the community, nor did it specify a full specific location of the PU. Furthermore, the sample was obtained from a single medical facility. As a result, we recommend larger-sample size prospective investigations and to examine all variables and their correlations.

5. Conclusion

The study provided a solid proof that hydrocolloid dressing with conservative treatment is an effective approach to prevent or minimize the occurrence of bedsores. Given the need to implement a preventive measure with the conservative treatment of pressure ulcer that eventually can reduce, the adverse effect associated with patient condition and increased care cost. It is necessary to promote trials that lead to compare different preventive measures. Furthermore, health care providers must be well oriented about Braden scale and how to implement it correctly.

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