

Effect of Aloe Vera on Pressure Ulcer Healing among Bed Ridden Patients

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Abstract

Background: The exploration of aloe vera's effects on pressure ulcer (PU) healing offers a promising avenue for enhancing wound care, particularly in bed ridden patients. As research continues, it holds the potential to improve healing rates and overall patient quality of life. **Aim of the study:** evaluate the effect of Aloe vera on pressure ulcer healing among bed-ridden patients. **Research design:** A quasi-experimental research design (study/control) was utilized in the current study. **Setting:** The current research was conducted in the Gastrointestinal and hepatic hospital (Medical Intensive Care Unit & Main Minia University Hospital (Medical Care Unit & Trauma Intensive care unit), **Minia city, Egypt.** **Sample:** A purposive sample of 60 patients was randomly assigned to study and control group (30 for each). **Tools:** **Tool I:** Personal and medical assessment sheet, **Tool II:** BATES- JENSEN wound assessment tool, consisted of thirteen assessment parameters that was used to investigate wound status. **Results:** The study findings showed that time of healing, it was found that PU healed faster among study group (20%) after 1st week. In contrast (3.3%) of the control group had a PU that not healed within the 1st week of observations, with highly statistical significant differences between the study and control groups regarding exact time of complete PU healing according BATES JENSEN Wound Assessment. **Conclusion:** Aloe vera had positive effect on the recovery process of pressure ulcer among bedridden patients with low cost and easy techniques. **Recommendation:** Use of Aloe vera is effective for healing of pressure ulcers.

Keywords: Aloe Vera, Bed Ridden Patients, Healing & Pressure Ulcer

Introduction

Pressure ulcers (PUs) are a serious problem in healthcare systems across the world, which frequently happen to people with limited movement or those who are confined to beds or chairs for lengthy periods of time, PUs caused by continuous pressure on the skin and underlying tissues. PU is considered serious clinical, financial and psychological challenges. Despite improvements in medical care, PU still a common and upsetting problem that requires coordinated management and preventative measures (Kandula, 2025) Pressure ulcers are described as localized injury to the skin and underlying tissue, resulting from pressure or pressure in conjunction with shear; they generally develop over a bony prominence but may also be associated to medical equipment or another object

the bedridden patient high risk for pressure ulcer (Paquin et al., 2025).

Bedridden is a form of immobility that can present as the inability to move & limitation of activities (Wagstaff & Coakley, 2024). In Critical care unit bedridden patients are susceptible to PUs because to diminish feeling, limited movement, increased skin wetness from incontinence, and the use of various medical equipment & the risk of hospital-acquired pressure injuries rises up to 37 times for patients who are bedridden as opposed to healthy people (Aloweni et al., 2019)

There are four stages of PUs; Stage I: The skin is intact with the presence of non-blanchable erythema. Stage II: There is partial-thickness skin loss involving the epidermis and dermis. Stage III: There is a full-thickness loss of skin that extends to the subcutaneous tissue but does not cross the fascia

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beneath it, the lesion may be foul-smelling. Stage IV: There is full-thickness skin loss extending through the fascia with considerable tissue loss. There might be possible involvement of the muscle bone, tendon, or joint (**Zaidi & Sharma 2024**).

Additionally, these stages, unstageable and suspected deep tissue injuries are also recognized: Unstageable pressure injury; described as the depth of the tissue damage cannot be determined because the wound bed is covered by eschar or slough. The true extent of tissue damage is unknown until the eschar or slough is removed, deep tissue injury: a purple or maroon localized area of discolored intact skin or a blood-filled blister may be present. The injury may be preceded by tissue that is painful, firm, mushy, or boggy. The depth of tissue damage is unknown (**Ogbor et al., 2024**)

The most common sites for developing PUs including the head, ears, shoulders, elbows, hips, buttocks, knees, ankles, and heels. They occur due to prolonged pressure, moisture, and friction, which hinder blood circulation and diminish oxygen supply to the tissues, resulting in damage and necrosis (**Gbadamosi et al., 2023**).

The main risk factors for forming PUs include reduced mobility or activity and an increased risk of being subjected to static and dynamic frictional forces. A secondary factor contributing to this issue is a reduced ability to sense, resulting in less mobility or activity since individuals may refrain from moving if don't feel discomfort. Additionally, nociceptive pain can occur due to damage to cells and tissues. When mobility issues are not present, the chances of developing PUs are lower; however, injuries related to medical devices may still happen (**Hussein, 2025**).

Patient with PUs suffer from pain and discomfort, and also may have prolonged illness, delayed rehabilitation, increased hospital stay, disability and may even face death resulting from the ulcer and its complications (**Berihu et al., 2020**).

Pressure ulcers affect a large scale of people, despite advances in technology, the rate continues to increase. This increases morbidity, health care costs and mortality (**Mohamed Tawfik, 2021**).

Pressure ulcers arising from cancer and cardiovascular disease are the third most expensive condition. Physical, financial, and social consequences of pressure ulcers can also affect different individuals and groups, including patients,

caregivers, families, and medical personnel (**Safdari et al., 2021**).

Pressure ulcers management often requires a multidisciplinary team, including healthcare professional such as wound care specialists, nurses, dietitians, physical therapists, and physicians. Collaboration among team members ensures comprehensive care, addressing various aspects of the individual's health and promoting optimal healing (**Seaton et al., 2020**).

There are a lot of alternative methods that use in treatment of PUs such as Honey dressing & adequate intake of vitamin C that is important for wound healing. Also acupuncture that has the potential to improve blood circulation and speed up the healing of PUs, in addition to Aloe vera gel that has a positive effect in skin disorders, including psoriasis mouth sores, bedsores and dry skin (**Huang et al., 2023**)

Aloe vera (AV) plays an important role in the wound healing process, its contents have the function of moisturizing wounds, preventing infection, providing nutrition, accelerating skin regeneration so that it can speed up the wound healing. AV contains B complex vitamins such as thiamine which function to repair nerve cells for the human body. Wounds that occur due to various incidents can affect nerve cells, one of which is damaging nerve cells in body tissue which causes the body to release hormones prostaglandins which stimulate pain & inflammation. Therefore, the body needs vitamin B to repair nerve cells which will later help the process of tissue growth in wounds and reduce pain by reducing levels of prostaglandin hormone production (**Rozani et al., 2024**).

Nurses play a pivotal role in the prevention, early detection, and management of PUs, given their frontline position in patient care. As primary caregivers, nurses are responsible for conducting regular skin assessments, implementing preventive measures, and coordinating interdisciplinary interventions. Moreover, nurses serve as leaders in promoting a culture of patient safety and quality improvement within healthcare settings. Consequently, investing in nursing education, training, and professional development is essential for optimizing PU prevention and management practices (**Kandula, 2025**)

Aloe vera possesses a great therapeutic importance in traditional medicine. It has attracted the attention of modern medical fields due to its wide pharmacological applications. The bioactive substances in AV proved to have antioxidant, anti-

inflammatory, antibacterial, and antiviral properties, especially for promoting the healing of cutaneous wounds with rare adverse effects, it provides a cheap alternative to many expensive synthetic drugs. Recent techniques in tissue engineering created novel scaffolds based on Aloe gel extracts for wound healing applications (**Massoud, et al., 2023**).

Wound care is the action of nurses to maintain homeostasis of the wound condition so that the wound can heal physiologically using methods, where currently the most popular method is using modern wound care dressings with the time application, one of which is using the aloe vera enzyme method for the healing process (**Rozani et al., 2024**)

Significance of the Study:

Pressure ulcers rank as the third most expensive condition following cancers and cardiovascular diseases (**Sari et al., 2025**). They present a considerable challenge in healthcare, impacting as many as 50% of patients in hospital settings (**Lovegrove et al., 2025**)

The prevalence rate of pressure ulcers is 12.8% worldwide. Although pressure ulcers are considered to be a preventable and predictable form of harm, an estimated 2.5 million PUs are treated each year in the United States. Furthermore, prevalence and incidence of PUs is increasing due to an ageing population and a rise in the number of individuals with chronic conditions, disabilities and comorbidities (**Rapetti et al, 2023**).

The prevalence of PUs varies widely, ranging from 0.4% to 38.0% in major hospitals, 2.2% to 23.9% in long-term care facilities, and 0% to 17% in home care settings. Notably, intensive care units exhibit a particularly high incidence at 9.4%, followed by orthopedic units at 8.0%, emergency departments at 7.7%, and neurosurgical units at 6.0% (**Li et al., 2020**).

Pressure ulcers are globally acknowledged as one of the five most prevalent causes of patient harm. Millions are affected around the world (**Shiferaw et al., 2020**). The incidence of PUs in Egypt were reported to be 10-25.9% among critically ill patients confined to ICU beds, which is a higher incidence than that reported in general hospital population (**Mahmoud et al., 2022**)

Based on the investigator's clinical insights during student training, numerous bedridden patients report PUs of varying severity during their hospital stay, leading to prolonged hospitalization,

reduced turnover, and greater discomfort. The investigator noted a lack of prior studies at this location addressing the effect of aloe vera on the healing of PUs among bedridden patients, which could be highly advantageous when applied appropriately and may enhance patient outcomes. This study was carried out to assess the effect of Aloe vera on pressure ulcer healing among bedridden patients

Aim of the Study

Evaluate the effect of Aloe vera on pressure ulcer healing among bed-ridden patients.

Research Hypothesis; to fulfill the aim of the study it was hypothesized that:

- 1- Applying aloe vera on PUs among bedridden patients will improve healing for study group than control group.
- 2- Healing of PUs among study group using aloe vera will occur rapidly in less duration compared with control group.

Operational Definition

Aloe vera is known as a “healing plant”, with beneficial effects in wound healing, UV protection, anti-oxidant and anti-microbial purposes. It's also regarded as a traditional medicinal plant for long years ago.

Patients and methods

Research design: Quasi-experimental research design (study/control), aims to establish a cause-and-effect relationship between an independent and dependent variable to determine whether there is a causal relationship between the intervention and the outcomes (**Baker, 2017**).

Settings: This study was conducted in two hospitals at Minia University Hospitals, Minia City, Egypt. Gastrointestinal and Hepatic Hospital (Medical Intensive Care Unit) & Main Minia University Hospital (Medical Care Unit & Trauma Intensive Care Unit)

Sample: A purposeful sample of 60 bed ridden patients (male and female) admitted to previously mentioned intensive care units. A simple random sampling technique was used to allocate the patients into the control and study groups with an equal rate. The study group 30 patients and control group 30 patients.

Sample Size:

Sample size was determined based on the following Formula, (Sharma et al., 2020)

$$N = \frac{t^2 \times p(1-p)}{m^2}$$

$$N = \frac{1.96^2 \times 410(1-0.041)}{0.05^2}$$

$$N = 60$$

N= required sample size

T= confidence level at 95% (standard value of 1.96)

P= estimated prevalence of patients' admission in selected areas in 2022 = 410 (0.041).

m = margin of error at 5 % (standard value of 0.050)

Inclusion Criteria:

Critically ill patients in the age group ranged from 18 to 64 years old, bedridden & had PUs.

Exclusion Criteria:

Patients were excluded if they had one or more of the following criteria:

- Patients with diseases that affect ulcer healing negatively as un-controlled diabetes mellitus, chronic hypoxemia, cancer, heart failure, severe irreversible shock, hypo-proteinemia and chronic renal failure, in addition to those who has allergy to aloe vera and not found patients have allergy to aloe vera.
- Patient who refuses to participate in the study.

Tools used in collecting data two tools were used in this study;

- The first tool was designed after an extensive literature review and contains two parts.
- The second tool was adapted from Barbara Bates-Jensen (1992)

Tool I: Patient Assessment sheet that includes two parts:

- **Part I:** Personal data including (patients' age, gender, education, occupation, residence & marital status)
- **Part II:** Patient's medical data including (diagnosis, past medical history, degree of PU, exact time of complete pressure ulcer healing)

Tool II: BATES- JENSEN Wound Assessment tool, this tool was adapted from Barbara Bates-Jensen (1992) and consists of thirteen assessment parameters that were rated to investigate wound status including (size, depth, edges, necrotic tissue type, undermining, necrotic tissue amount, exudate type, exudate amount, skin color surrounding wound, granulation tissue, epithelialization, peripheral tissue edema & induration) (Bates - Jensen et al., 1992).

Scoring System:

The BATES- JENSEN wound assessment tool (BWAT) item-level scores range from 1-5. Each item is scored based on the wound characteristic it describes, where 1 indicates the least severity and 5 indicates the most severity. The 13 scored items are summed to obtain a maximum total score of 65 and are divided into severity categories as the following:

- 1 to 13 = no severity
- 14–20 = minimal severity
- 21–30 = mild severity
- 31–40 = moderate severity
- 41–65 = extreme severity (Gupta et al., 2023).

Content Validity:

The study tools were revised by a panel of five experts in the field of medical surgical & critical care nursing at Faculty of Nursing, Minia University done to assess the tools' clarity, viability, and applicability.

Reliability:

- Reliability was ascertained statistically by using Alpha Cronbach test to ensure that the study tools are reliable as shown in the following table:

Tools	Cronbach's alpha
Patient Assessment	0.876
Adapted BATES- JENSEN Wound Assessment Tool	0.756

Pilot Study:

A pilot study was conducted in order to establish the clarity, feasibility, and applicability of the study tools. It was carried out on 10% of the study patients, which equals six patients who fulfilled the inclusion criteria to test the feasibility, objectivity, and applicability of the study tools and to estimate the needed time to complete the data collection at the gastrointestinal and hepatic

hospital (medical intensive care unit) & Main Minia University hospital (medical care unit & trauma intensive care unit). Limited adjustments were carried out accordingly and those patients were included in the study.

Ethical Considerations:

All necessary formal permits were obtained from the appropriate authorities to conduct this research. After reviewing the research proposal, the Faculty of Nursing's Ethics Committee at Minia University approved the study (REC202345A) Written research approval was also obtained from the Director of Minia University Hospitals, the head of Hospitals Nursing, and oral consent was obtained from the head nurse of each unit. Oral consent was obtained freely and voluntarily from each patient after clarifying the purpose of the study to patients included in the study, and patients were informed that they could choose whether or not to participate in the study, and that they had the right to withdraw at any time. Privacy, confidentiality, and anonymity were all ensured during data collection and encoding.

Study Procedure

The current study was achieved through four phases:

The Preparatory Phase

The actual study was begun by preparing of various data gathering tools after reviewing of the previous and current literature in the field of the study by using textbooks, journals, researches and periodicals (Gefen, 2020), (Bates Jensen et.al., 1992), (Sadoyu et al ., 2021) & (Gardner et al ., 2022).

Prior to actually data collection, the investigator visited the previously stated hospitals to integrate and establish recruitment plans. This phase facilitated directing, planning, and constructing the study procedure, and also acquiring formalized approval on June 14th, which was accepted one month prior to the study's undertaking. The investigator furthermore starts preparing the Aloe Vera that will be used to dress the pressure ulcer. This was supervised by Prof Dr /Usama Farghaly, Head of the Pharmaceuticals Department.

Assessment Phase:

Throughout this phase and after that the investigator evaluated patients who fulfilled the inclusion criteria, patients were divided randomly

into two groups (study and control). The investigator first gathered information from the control group and then from the study group utilizing Tool I (patient's personal and medical data) from patient files and family members. Also, during this phase investigator started with build a better interaction session for establishing therapeutic relationship and to describe the meaning and purpose of research to each participant separately.

Implementation Phase

The investigator utilized aloe vera dressing two times per day (morning and night shifts) to the study group after doing test to assess sensitivity to the material in intact skin to make certain that patients did not have any adverse reactions to it. The investigator also shared the conduct with nursing internship students, who attended during night shifts, and this was maintained until healing / three weeks duration. The control group received typical routine hospital care.

Evaluation Phase

During this phase the investigator evaluate the healing of PUs among study by using AV dressing & control group by using routine hospital care by using Tool II (BATES- JENSEN wound assessment tool) for two groups three evaluations were done after baseline observation as follow:

- **1st evaluation** was done after ending of the first week / complete healing
- **2nd evaluation** was done after 2week /complete healing
- **3th evaluation** was done after 3 week / complete healing

Data collection took about 6 months (from June 2023 to the end of December 2023).

Limitations of the study;

There was no documented number of actual pressure ulcers cases in hospitals

Difficulty in monitoring PUs in patients with spinal fracture due to the difficulty of changing position.

Statistical Data

The data was tabulated and analyzed using SPSS (statistical program for social science, version 20). Descriptive statistics were used to collect, tabulate, and show the data in either number and/or percentage for qualitative data or using means and standard deviations to evaluate dispersion for

quantitative data. For qualitative data, the Chi square test was used to compare independent groups. The Friedman Test is a non-parametric statistical test used to determine whether there are significant differences between three or more related samples. P-values 0.05 were accepted as the

degree of significance, while P values of < 0.01 were indicated highly significant. Correlation coefficient was used to present a numerical overview of the degree and direction of the linear relation between variables.

Results;

- NB

- **Pre** means the baseline observation
- **Post I observation** means 1st observation after the first week of applying AV dressing for study group & routine hospital dressing for control group.
- **Post II observation** means 2nd observation after the second week of applying AV dressing for study group & routine hospital dressing for control group.
- **Post III observation** means 3rd observation after the third week of applying AV dressing for study group & routine hospital dressing for control group.

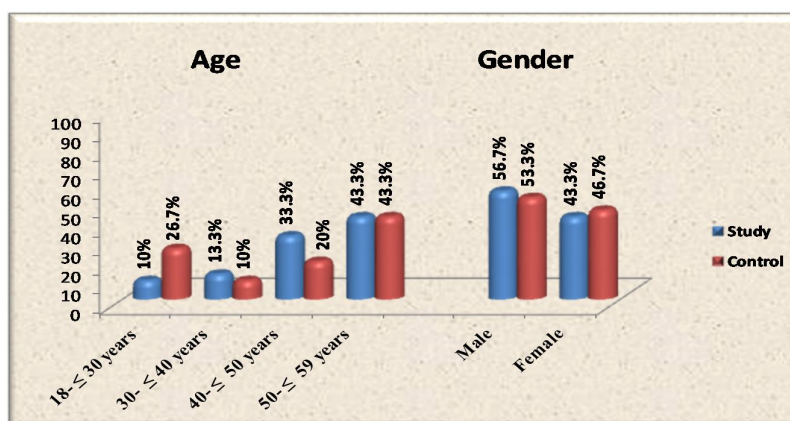


Figure (1) Percentage Distribution of Study and Control Group regarding their Age and Gender (n = 60)

Figure (1) shows that about (43.3 %) of both study and control group aged greater than 50 Yrs. As regard gender, it was found that, more than half of both groups were male (56.7% and 53.3%, respectively).

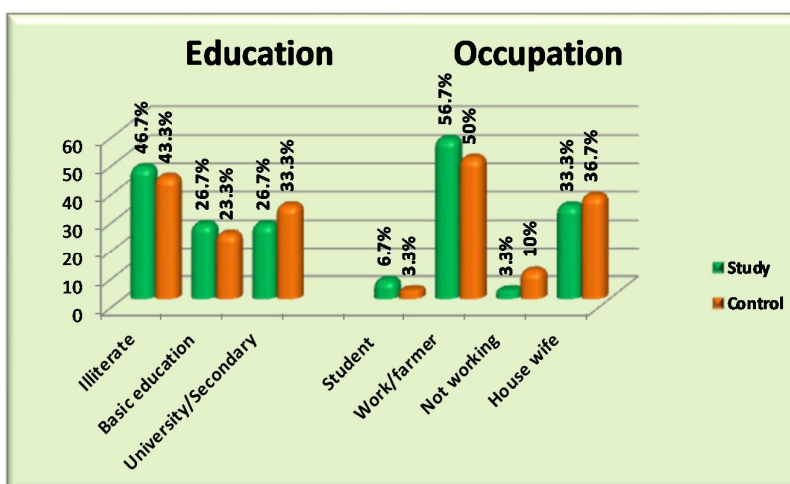


Figure (2) Percentage Distribution of Study and Control Group regarding their Education and Occupation (n = 60)

Figure (2) Discloses that 46.7% of the study group compared to 43.3% of the control group were illiterate and about half of them (56.7% & 50% respectively) were workers/farmers.

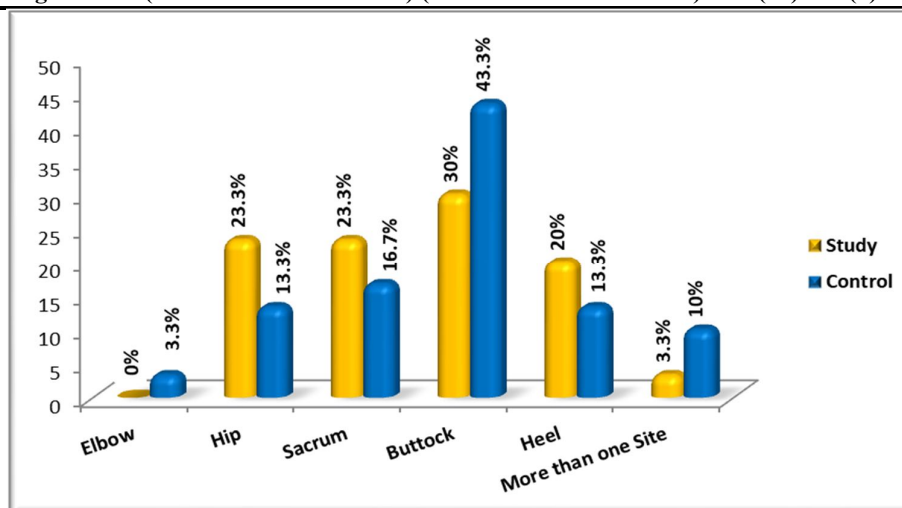


Figure (3) Percentage Distribution of Study and Control Group regarding Sites of Pressure Ulcers (n = 60)

Figure (3); displayed that 30 % of the study group had developed PU at the buttocks compared to 43.3 % among the control group.

Table (1): Distribution of Study and Control Group Regarding to Albumin & Glucose level (n=86)

	Study (n=30)		Control (n=30)		X ² (P value)
	N	%	N	%	
Albumin					
- Normal level	15	50	12	40	0.606 (0.436)
- Decreased level	15	50	18	60	
- Mean ± SD	3.38 ± 0.301		3.24 ± 0.398		
Glucose					
- Normal level	26	86.7	29	96.7	3.16 (0.026)
- Decreased level (hypoglycemia)	3	10	0	0	
- Increased level (hyperglycemia)	1	3.3	1	3.3	
- Mean ± SD	132.7 ± 40.2		114.1 ± 33.3		

Table (1) Discovers that 50% of the study group, compared to 60% of the control group, had hypo-albuminemia. Additionally, the majority of both groups had normal blood glucose levels (86.7% and 96.7%, respectively).

Table (2): Frequency Distribution of Both Study and Control Group Regarding PU severity according BATES- JENSEN Wound Assessment Pre and Post I, II & III observations (n=60)

Pressure Ulcer Severity	Pre		Post I		Post II		Post III		Friedman test (P value)
	Study (n=30)	Control (n=30)	Study (n=30)	Control (n=30)	Study (n=30)	Control (n=30)	Study (n=30)	Control (n=30)	
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
No Severity: (1 -13)									
	0 (0)	0 (0)	6 (20)	1 (3.3)	20(66.7)	1 (3.3)	29(96.7)	1 (3.3)	44.6 (0.001**)
Minimum Severity: (14 - 20)									
	13(43.3)	11 (36.7)	13(43.3)	0 (0)	7 (23.3)	0 (0)	1 (3.3)	3 (10)	
Mild Severity: (21 – 30)									
	6 (20)	12 (40)	6 (20)	9 (30)	2 (6.7)	7 (23.3)	0 (0)	6 (20)	
Moderate Severity: (31 – 40)									
	6 (20)	4 (13.3)	5 (16.7)	11 (36.7)	1 (3.3)	10 (33.3)	0 (0)	2 (6.7)	

Pressure Ulcer Severity	Pre		Post I		Post II		Post III		Friedman test (P value)
	Study (n=30)	Control (n=30)	Study (n=30)	Control (n=30)	Study (n=30)	Control (n=30)	Study (n=30)	Control (n=30)	
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
Extreme Severity: (41 – 65)									
	5 (16.7)	3 (10)	0 (0)	9 (30)	0 (0)	17(56.7)	0 (0)	18 (60)	
X ² (P value)	3.6 (0.06)		22.9 (0.001**)		21.6 (0.001**)		13.2 (0.002**)		

** Highly Statistical Significant Difference ($P \leq 0.01$)

Table (2): revealed that about (43.3%, 20%, 20%, 16.7% respectively) had minimum, mild, moderate, extreme PU severity among study group compared to (36.7%, 40%, 13.3%, 10% respectively) among control group at baseline assessment.

After applying AV dressing to study participants and routine hospital dressing to control participants; it was found that nearly all participants (96.7%) among study group compared to only (3.3%) among control group have no PU severity with highly statistical significant difference ($P \leq 0.01$).

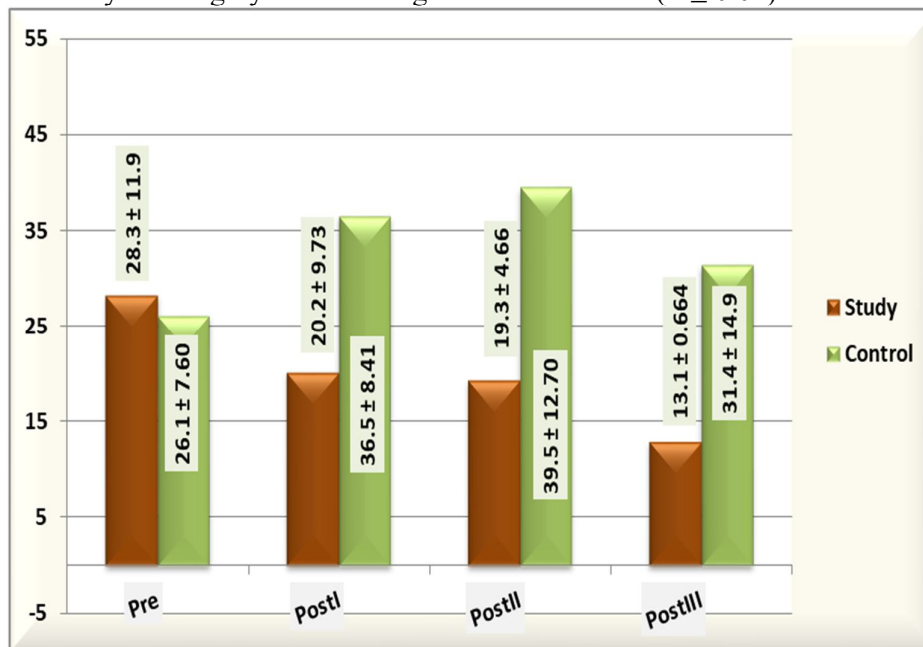


Figure (4): Mean of total Score of BATES- JENSEN Wound Assessment Tool for both Study and Control Group Pre and Post I, II&III observation (n=60)

Figure (4) demonstrate that the study group had a significant decrease in total mean score of BATES-JENSEN wound assessment from (28.3 ± 11.9) pre intervention to (13.1 ± 0.664) on the third observation compared to the control group who had an increased in total mean score from (26.1 ± 7.60) pre intervention to be (31.4 ± 14.9) on the third observation with high statistical significant differences.

Table (3) Frequency Distribution of Both Study and Control Group Regarding time of complete PU healing.

Time of Complete PU Healing	Study (n=30)		Control (n=30)		X ²	P-value
	N	%	N	%		
- Not healed throughout the research period (three weeks).	1	3.3	29	96.7	40.4	0.001**
- Healed within the 1 st week	6	20	1	3.3		
- Healed within the 2 nd week	14	46.7	0	0		
- Healed within the 3 rd week	9	30	0	0		

** Highly Statistical Significant Difference ($P \leq 0.01$)

Table (3) demonstrates that about nearly all participants through first, second, third week (20%, 46.7%, 30% respectively) have complete PU healing after applying AV dressing compared to (303%, 0%, 0%, respectively) who are in routine hospital care.

Table (4): Correlation between time of Pressure Ulcer Healing and site of pressure ulcer among both Study and Control Group (n=60)

Variable	Time of PU healing			
	Study(n=30)		Control (n=30)	
	R	P	R	P
Site of pressure ulcer	0.201	0.287	0.018	0.925

Table (4) assures that there is no significant correlation between site of pressure ulcer with time of ulcer healing.

Table (5): Correlation between wound assessment severity score and Complete healing and Time of healing among both Study and Control Groups (n=60)

Variables	BATES- JENSEN wound assessment severity score			
	Study(n=30)		Control (n=30)	
	R	P	R	P
Complete Healing	- 0.391	0.033*	0.127	0.504
Time of Healing /Weeks	0.730	0.001**	0.127	0.504

* Statistical Significant Difference ($P \leq 0.05$)

** Highly Statistical Significant Difference ($P \leq 0.01$)

Table (5) reveals a significant negative correlation between the wound severity score and the PU complete healing, with p value of 0.033. Additionally, a highly significant positive correlation between the wound severity score and the time needed for a PU to heal has been demonstrated, with a p value of 0.001.

Discussion

Regarding personal data of the sample under investigation, the current study showed that the largest percentage of study and control group participants were between the ages of 50 and 59 years. According to the investigator point of view, this might be due to age-related skin changes that can raise the risk for developing ulcers. This was confirmed by (Serag et al., 2022) who mentioned that the highest percentage among study sample age was between 50 to 60 years.

As regards to gender, it was found that more than half of study and control group were males, according to the investigator view, this could be because men have less subcutaneous adiposity than women, which makes them more susceptible to ulcers. the same case study is in the same line with Nguvulu (2024) who reported that more than half of his study were males and about one third were females as well as Bhandari & Dhudum, (2022) who mentioned that around half of the study and control group were male in their research about AV effect on PU among bed ridden Pts. on another hand this result was in contrast with Koban et al., (2024). who stated that according to the results of their study, the risk of pressure ulcers increases in female patients. Also, the majority of study and control group were married, which is supported by Mustafa & Oliman, (2022) who recorded that the greatest proportion of married people among the categories under study.

Concerning educational level, it was discovered that the majority of study and control

group were illiterate, in contrast Ahmed & Mohamed, (2021) mentioned that the majority percent of participants had basic level of education

The current study documented that more than half of study and control groups were **worker/farmers** which is agreed by Singh (2020) who reported that most of his studied subjects were skilled workers.

Concerning PUs features, the current study cleared that the most common anatomic location of pressure ulcer was the buttocks area, this may be explained by the fact that the study sample acquired pressure ulcers because they were not provided with proper regular treatment, such as positioning and supine posture. This is consistent with Nguvulu's (2024) research, who found that the gluteal area was the most often seen location , also this finding was in harmony with research done by Mutabazi et al. (2015) that found the buttocks to be the most prevalent site for pressure ulcers. While the present findings were contradicted with (Cox et al., 2022) who found that the most of pressure injuries were deep tissue injury and the common location of pressure injury was the sacrum area

Regarding laboratory tests, it became apparent that half of the study and control groups in current study had hypoalbuminemia since serum albumin was one of the independent factors that determined PU. Moreover, hypoalbuminemia can reduce fibroblast cell activity, restrict angiogenesis during the proliferative phase, and lessen collagen formation and maturation during the remodeling phase. This result was supported by Chen et al.,

(2024) who reported that the frequency of hypoalbuminemia in their study was about quarter at the time of admission results from a high incidence of PU one third in patients admitted to ICUs. Also, **Dang et al., (2022)** showed that albumin level was below normal in most ICU patients.

Additionally, the results of this study showed no statistically significant differences between the study and control groups with regard to the patients' personal or medical information. From the perspective of the researcher, this indicates that the two groups were similar prior to the intervention, so the results are attributed to the intervention that was carried out and only marginally impacted by the patients' personal or medical information. These results are corroborated by **Mustafa & Oliman, (2020)**, who found no statistically significant variation in demographic characteristics between the study and control groups. Additionally, the origin, kind, and location of PU wounds were not statistically significant in this investigation, according to **Dantas de Araújo et al. (2020)**.

According to BATES-JENSEN Wound Assessment, the current study's findings showed a highly statistically significant difference in the severity of the wounds between the study and control groups during the course of the study, **Muslim et al. (2024)** supported this finding in their systematic review as they noted that AV aids in reducing the severity of wounds also **Daphne & Prince (2019)** concurred, stating that the application of AV dressing to wounds was effective in reducing wound severity and accelerating wound healing. Furthermore, **Febrian (2021)** described AV phenolic components as antioxidants that can fortify the body's defenses, hence promoting the growth of wounds.

Regarding wound assessment score, according to the current study, the study group exhibited a substantial drop in mean score of BATES- JENSEN wound assessment from pre observation to the third observation, these finding is agreed by **Serag et al., (2022)** who discovered that the mean score of patients' wound healing was lower after adopting the interventional program compared to before program implementation, indicating that patients' wound healing had improved. Statistical significant difference was also seen between the two groups when **Hekmatpou et al. (2019)** compared the average improvement in

both groups at baseline and on the fifteenth day regarding wound assessment score.

Concerning healing of PUs, it was found that the study group' ulcers healed faster compared to control group that had a pressure ulcer that not healed within the time of observations. These findings were in harmony with **Bhandari & Dhudum, (2022)** who reported that the sample in control group also had recovery for their PUs, but comparatively was slower than the experimental group. The investigator regarded that difference in the findings to the type of pressure ulcer in the previously mentioned study as they include the first-degree pressure ulcer only in there study while the current study include first, second and third degree of PUs, the finding data could be attributed to the research hypothesis that Applying aloe vera on PUs among bedridden patients improves healing for study group than control group.

The current study results documented that there was a highly significant positive correlation between time of healing of PUs and score of BATES- JENSEN wound assessment after implementing AV on bed ridden patients, this result was supported by **Zanaty et al., (2017)** who revealed a highly statistical significant differences between both study and control groups in their study. as well as **Khorasani et al., (2019)** revealed that there was significant difference between study and control groups regarding wound healing time after applying AV. The finding data could be attributed to the second research hypothesis that healing of PUs among study group using aloe vera occurs rapidly in less duration comparing with control group.

Finally, these findings validate the results of the present investigation. Furthermore, it seems possible to rely on natural therapies, such aloe vera, which often have positive benefits, reduce treatment costs and patient expenses, and have fewer negative effects on the patients undergoing therapy.

Conclusion

Aloe vera had a positive effect on the healing process of pressure ulcers in bed ridden patients with rapid and complete healing.

Recommendation:

The application of Aloe vera is recommended for healing process of pressure ulcers and Replication of the study on a great probability sample in different geographical areas in Egypt to

formulate the main aspects of these problems, for generalizing the findings

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