Original Article

Effect of aloe vera pulp on pressure ulcers among bed ridden patients

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Abstract

A study to assess the effectiveness of aloe vera pulp on pressure ulcers among bed ridden patients in tertiary hospitals of Sangli Miraj and Kupwad Corporation Area. The study aims to know the effect of Aloe Vera pulp on pressure ulcers among bed ridden patients. Quantitative research approach with two group pre-testpost-test was used for this study. The conceptual framework used in this study was Jennet W. Kenny's open system model.30 samples were selected for the study by purposive sampling technique (15 in experimental group and 15 in control group).Data was collected using demographic data and self-structured tool for assessment of pressure ulcer and Numerical pain scale for assessing pain. Data analysis was done using descriptive and inferential statistics. The study result revealed that the application of aloe vera pulp along with the daily nursing care, over the 1st degree pressure ulcers was effective in reverting the condition of affected skin and also it helps in reducing the pain. In the comparison of pressure ulcer and pain level in experimental & control group unpaired t test was used. The test statistics value of the unpaired t test for pressure ulcer was 6.54 with p value 0.000, (p value is <0.05). And for pain level the test statistics value of the unpaired t test was 7.60 with p value 0.000, (p value is <0.05). Hence, the study shows that there is difference between the experimental and control group and proves that the application of aloe vera pulp along with the routine nursing care is found to be effective in treating the 1st degree pressure ulcers.

Keywords: Assess, Effectiveness, Aloe vera, Pressure ulcer, Decubitus ulcer, Bed ridden

Introduction

Pressure ulcers represent a common health problem among the immobilized patients that prolong their period of hospitalization. The skin care, reduction of pressure on the bone prominence areas, and mobilizing the bedridden patients can provide a significant difference in pressure ulcer development. It can range from mild reddening of the skin to severe tissue damage and infection extends into the muscles and bone.[1] Skin (self-) care is part of human life from birth until death. Today many different skin care practices, preferences, traditions and routines exist in parallel. In addition, preventive and therapeutic skin care is delivered in nursing and healthcare by formal and informal caregivers. The aim of this contribution is a critical discussion about skin care in the context of professional nursing practice. Special attention should be paid on high risk skin areas, which may be either too dry or too moist. From a safety perspective the protection and maintenance of skin integrity should have the highest priority.[2]Pressure injuries that are not open wounds (such as blisters and non-blanching erythema) are not true sores, but only "pressure damage" and still belong to this family of pressure ulcers.[3]Skin health is essential to the wellbeing of older people and a fundamental aspect of nursing care. Nurses should regularly assess the skin health of older patients, promote self-care and encourage the use of appropriate products.[4] The time has come for health care professionals to conquer the problem of pressure ulcers.

Although the prevention of pressure ulcers is a multidisciplinary responsibility, nurses play a major role.[5] Patients who are critically and chronically ill and those with immobility or incontinence are at risk for

developing a broad range of adverse skin conditions such as pressure ulcers (PUs).[6]The mobility and also the positioning of the patient becomes limited as a result of various invasive and respiratory devices, catheters, and also the application of restraints; all these my increase the chance of pressure ulcer development.[7]Moreover, due to continuous changes in skin and underlying soft tissue structure and function, advancing age can also be regarded as an independent risk factor for developing skin problems. [6] Where the skin barrier is impaired, appropriate interventions to treat dry skin or protect the skin from exposure to irritants should be provided. Every time something is placed on the skin, a functional and structural response is provoked. This response can be either desired or undesired, beneficial or harmful. Herbal therapy for skin disorders has been used for thousands of years. In India, records of Ayurvedic medicine date back to about 3000 BC. The system of Ayurvedic medicine combines physiological and holistic principles. Herbal therapy has increased in popularity in the past two decades among patients seeking alternative treatments to conventional Western allopathic medicine[4]

The application of Aloe vera, as a complementary treatment along with current methods, can improve wound healing and promote the health of society.[8]Aloe vera is a non- pharmacological technique utilized in the treatment of Pressure ulcers and is proven to be effective in various research studies.[7] Aloe vera leaves are rich in vitamins, enzymes, minerals, amino acids, and has the anti- inflammatory, anti-fungal, anti-helminthic, antioxidant, antiseptic and the cosmetic properties. Moreover has an ability to cure minor cuts and burns, acne, protects from injury to the epithelial tissue and heals the skin.[9] Patients confined to bed are at high risk of pressure injury development. These patients are immobilized on the bed because of various reasons. Other factors such as nutritional deficiencies, loss of consciousness, and severity of illness, taking certain medications, urinary incontinence and/or bowel incontinence, sweating and excessive moisture in the skin, edema, and inappropriate use of medical devices also increase the risk of pressure injury.[10] The development of pressure injury in hospitalized patients is considered as a negative point of healthcare providers and systems. Therefore, the prevention of pressure injury is highly important, especially for the nursing team. These skin lesions have pain that is usually associated with serious infections.

The early detection of this issue can aid in preventing further issues that can complicate an individual's health and cause economic burden and lengthen the hospital stay. It can increase patients' dependability and alleviate his self-concept as well.[5]

Material and methods:

A quantitative research approach was adopted for the present study with quasi experimental two group pre-testpost-test design. The independent variable was aloe vera pulp and dependent variable was 1st degree pressure ulcer. The research study setting was selected as per needs and criteria i.e., the tertiary hospitals of Sangli, Miraj and Kupwad corporation area. Population consisted of bed ridden patients with 1st degree pressure ulcers. The samples were bed ridden patients with 1st degree pressure ulcers admitted in tertiary hospitals of Sangli, Miraj and Kupwad corporation area. Inclusion criteria was samples with probability of hospitalization for at least 07 days, patients who are above 18 years of age, patients having 1st degree pressure ulcer, willing to participate in the study. And those in exclusion criteria were patients found to be allergic to Aloe Vera pulp during skin test prior to application on 1st degree pressure ulcer areas, and patients those who have any skin diseases and are on treatment.

Sample size is calculated by using G power. Alpha 1%and power 80 %. Sample size was 30, with 15 in experimental and 15 in control group. The sampling method used was purposive sampling method. The data collection tool was developed as per the definition of 1st degree Pressure ulcer provided in--Taylor Lillis Lemone Lynn, Fundamentals of Nursing, The Art and Science of Nursing of Nursing Care, 7th Edition, Wolters Kluwer Publications. Page- 932-934&Judith M, Wilkinson and Karen Van Leuven, Fundamentals of Nursing, Theory Concepts and Applications. Volume 1, Jaypee Publications.Also after a substantial literature review, help of the research guide and the experts in the field, the researcher was able to develop a data collection tool.The data collection tool comprises of two sections:Section –I: Demographic data: To collect the baseline information of the subjects in the study. It consisted of Age, Gender and Diagnosed disorders.Section – II: Skin assessment Tool and Numerical Pain Scale.The skin assessment tool mainly consisted of Erythema, Skin Integrity, Skin Colour, Temperature, Skin Texture, Area Affected and the Exudate.Pain at the affected area was assessed using a Numerical Pain Scale. To ensure the content validity the experts were selected based on their

field of experience and also according to the topic of research study. The experts were provided with a copy of research proposal along with the data collection tool for doing the content validity The valuable suggestions and opinions provided by the experts were discussed with the guide and the necessary changes were adopted to prepare the final tool for this research study. Institutional ethics committee, meeting was held in Bharati Vidyapeeth (Deemed to be University), College of Nursing, Sangli and the research proposal was approved. Permission was obtained from concerned authorities of hospitals of Sangli and Miraj to conduct pilot study and the main study. Informed written consent was obtained from the participants prior to conducting the study after explaining the study objectives. The study was discussed with concerned authorities of the hospitals and 30 samples were selected for the study as per the inclusion criteria. 15 samples were selected for experimental and 15 samples for control group. The data collection was done in three phases. Phase I: Participants selected as per the inclusion criteria in both experimental and control group. Demographic data was collected. Skin assessment was done with the help of tool used in the study. Phase II: After performing the skin test, 5ml of Aloe Vera pulp was applied over the 1st degree pressure ulcer area for over 3 minutes for 07 days, twice a day, along with the routine nursing care in experimental group. And in control group only routine nursing care was carried out. Phase III: The skin assessment of the affected areas was done on 1st, 4th and 7th day in both experimental and control groups and the changes in observations were recorded.

The data was collected and recorded for 7 days in experimental group and in control group. Based on the objectives of the study, frequency, percentage, mean and sd were calculated. Comparison of pre-test & post-test within experimental group was done by paired t test. Comparison between post-test of experimental & control group was carried out by unpaired t test.

Result:

Frequency and percentage distribution is done for demographic variables. Effectiveness of aloe vera pulp on 1st degree pressure ulcer was observed by comparing the mean. The comparisons of post-test means of pressure ulcer among bed ridden patients in experimental and control groups were done by unpaired t test. The post-test average score of pressure ulcer of experimental group was 2.33 with standard deviation of 0.48. The post-test average score of pressure ulcer of control group was 3.53 with standard deviation of 0.51. The test statistics value of the unpaired t test was 6.54 with p value 0.000. Hence, it signifies that there is marked difference in the average score after application of aloe vera pulp along with the provided nursing care in the experimental group than the control group where only nursing care was provided.

Table No.: 1: Frequency and percentage distribution of Demographic Variables

N = 15+15=30

Sr. No.	Variable	Groups	Experimental		Control	
			Frequency	Percentage	Frequency	Percentage
1	Age	below 40 years	0	0	0	0
		41-50 years	5	33.33	6	40
		51-60 years	9	60	8	53.33
		above 60 years	1	6.67	1	6.67
2	Gender	Male	9	60	7	46.67
		Female	6	40	8	53.33
4	Diagnosed Disorders	Circulatory	0	0	2	13.33
		CNS	1	6.67	0	0
		Digestive	4	26.67	2	13.33
		Endocrine	1	6.67	2	13.33
		Muscular	1	6.67	0	0
		Respiratory	1	6.67	2	13.33
		Skeletal	6	40	6	40
		Urinary	1	6.67	1	6.67

Table no 1: The above table and the figures show that in experimental & control group maximum samples i.e. 60 % & 53.33% respectively were from the age group of 51-60 years,
among which the number of males (60%) exceeded the number of females (40%) in experimental group whereas the number of females (53.33%) were more than the number of males (46.67%) in control group. Most of the samples that were involved in the study were of skeletal system disorders with 40% in each group as the patients had devices and were immobilized for longer duration, also it was difficult to change their position frequently.And 6.67% of samples in experimental group were of CNS, Muscular, Endocrine, Respiratory &Urinary system disorders.Whereas, 13.33% samples in control group suffered from Circulatory, Digestive, Endocrine & Respiratory system disorders and 6.67% samples suffered from Urinary system disorders.

Item analysis as per parameters in terms of Frequency and Percentage
Table 2: Item analysis as per parameters– Experimental group

PARAMETERS		DAY 1		DAY 4		DAY 7	
		FREQUENCY	%	FREQUENCY	%	FREQUENCY	%
ERYTHEMA	Blanchable (0)	---	---	---	---	---	---
	Non Blanchable (1)	15	100	15	100	15	100
SKIN INTEGRITY	Intact (0)	15	100	15	100	15	100
	Loss of Dermis (1)	---	---	---	---	---	---
SKIN COLOUR	Normal (0)	---	---	6	40.02	10	66.7
	Red/ Purple (1)	15	100	9	60.03	5	33.35
TEMPERATURE (TO TOUCH)	Normal (0)	4	26.68	12	80.04	15	100
	Warm (1)	11	73.37	3	20.01	---	---
SKIN TEXTURE	Dry (1)	12	80.04	13	86.71	15	100
	Moist (2)	3	20.01	2	13.34		

Table No. 2 denotes the item analysis of each parameter in the experimental group.

On the 1st day it was observed that the samples included in the study had developed 1st degree pressure ulcer and various signs of it were visible. Normal temperature was felt in 26.68% samples & 73.37% of samples had affected area that was warm to touch. Also 80% samples had dry skin texture and 20% samples skin texture was moist.

On 4th day in the experimental group 100 % of samples had non blanchable erythema which was reduced in size as compared to 1st day of observation and the skin had remained intact. Among the 100% samples, 40.02% samples skin colour had changed to normal. 80.04% samples had the temperature that was normal at touch. Whereas, 86.71% had dry skin texture and only 13.34 had moist skin texture. On the 7th day of intervention it was observed that 66.7% samples skin colour was changed to normal and 33.35% samples skin colour had changes that were gradually changing to normal. Also the other parameters were gradually subsiding and improving the condition of 1st degree pressure ulcer. Hence, the samples remained in 1st stage even on 7th day but with observed improvement as the mechanical devices, comfort devices, diapers used in the treatment of samples generated pressure, friction and moisture over the pressure prone areas continuously. As all of the samples had intact skin and there was no loss of dermis, hence there was no area affected that was supposed to be measured in length * width (cms), and no exhudate was seen.

Table 3: Item analysis as per parameters – Control group

PARAMETERS		DAY 1		DAY 4		DAY 7	
		FREQUENCY	%	FREQUENCY	%	FREQUENCY	%
ERYTHEMA	Blanchable (0)	---	---	---	---	---	---
	Non Blanchable (1)	15	100	15	100	15	100
SKIN INTEGRITY	Intact (0)	15	100	15	100	15	100
	Loss of Dermis (1)	---	---	---	---	---	---
SKIN COLOUR	Normal (0)	2	13.34	4	26.68	4	26.68
	Red/ Purple (1)	13	86.71	11	73.37	11	73.37
TEMPERATURE (TO TOUCH)	Normal (0)	6	40.02	7	46.69	7	46.69
	Warm (1)	9	60.03	8	53.36	8	53.36
SKIN TEXTURE	Dry (1)	15	100	15	100	15	100
	Moist (2)	---	---	---	---	---	---

Table No. 3 denotes the item analysis of each parameter in the control group.

On 1st day it was observed that the samples included in the study had developed 1st degree pressure ulcer and various signs of it were visible. 86.67% of samples had change in the skin colour over the affected area and 13.34% did not show any change in colour over the affected area. All the other parameters were present in 100% samples that rated the affected area as 1st degree pressure ulcer. On 4th day in the control group 100 % of samples had non blanchable erythema which was reduced in size as compared to 1st day of observation and the skin had remained intact. 86.71% samples skin colour had changed skin colour and 13.34% samples skin colour was normal. Only 46.69% samples had the temperature that was normal at touch and 53.36% samples had area that was warm to touch. Whereas, all 100% samples had dry skin texture. On the 7th day in the post test it was observed that 100% of samples had change in the colour over the affected area, had a non-blanchable erythema. On the contrary, the temperature changes were seen, i.e. the affected area in 53.33% samples was warm to touch, & 46.67% samples had normal temperature over the affected area. All the other parameters also remained in 1st degree pressure ulcer and the recovery was gradual as compared to the experimental group as only nursing care was provided to the clients. The last two parameters are not included as all of the samples had intact skin and there was no loss of dermis, hence there was no area affected that was supposed to be measured in length * width (cms), and no exhudate was seen.There were statistically significant differences between the experimental and control group samples regarding 1st degree pressure ulcers. The changes were prominently seen in skin colour, temperature, skin integrity and pain. Erythema was also found to be reduced gradually in both the groups, however was found to be reducing rapidly in the experimental group. It was found that the nursing staff of various hospitals provided routine care to the patients regularly. Assessment of patients pressure prone areas and the site where the 1st degree pressure has already developed, were also done at each shift while giving and taking report. Hence, the samples in control group also had recovery, but comparatively was slower than the experimental group. Therefore, the skin integrity was found to be intact in both the groups. Moreover, the parameters like area affected that was supposed to be measured in length*width, only if the skin peeling occurs and exhudate which was the last parameter to be checked were absent in both the groups.

Table 4: General assessment of the pain level – Experimental group

Experimental Group	Groups	Score	Before		After	
			Frequency	Percentage	Frequency	Percentage
	No Pain	0	1	6.67	13	86.67
	Mild	1--3	14	93.33	2	13.33

Table No. 4 represents the level of pain in experimental group that was recorded before and after the intervention in the experimental group. In pre-test 6.67% samples had no pain. Around 93.33% samples had mild degree pain that was ranging from 1-3. In post-test it was observed that 86.67% samples experienced no pain and 13.33% samples had mild degree pain. This demonstrates that the aloe vera pulp along with the nursing care provided is effective in reducing pain over the affected area of 1st degree pressure ulcer. None of the samples had moderate (ranging from 4 – 6) and severe (ranging from 7 – 10) degree pain at the affected area during pre-test and post-test.

Table 5: Comparison of the pressure ulcer – Experimental Group (Paired t test)

Groups	N	Mean	S.D.	t value	P value
Pre-test	15	4	0	13.23	0
Post-test	15	2.33	0.48		

Table No.5 denotes the comparison of pre-test and post-test average pressure ulcer in experimental group was done by paired t test. The pre-test average score was 4.00 with standard deviation of 0.00. The post-test average score was 2.33 with standard deviation of 0.48. The test statistics value of the paired t test was 13.23 with p value 0.000. The p value is less than 0.05, hence it shows that there is a significant difference in the pre-test and post-test scores in the experimental group.

This demonstrates that, use of aloe vera pulp on pressure ulcers among bed ridden patients waseffective in treating 1st degree pressure ulcer.

Table 6: Comparison of the pressure ulcer – Exp. vs. Control (Unpaired t test)

The comparisons of post-test means of pressure ulcer among bed ridden patients in experimental and control groups were done by unpaired t test. The post-test average score of pressure ulcer of experimental group was 2.33 with standard deviation of 0.48. The post-test average score of pressure ulcer of control group was 3.53 with standard deviation of 0.51. The test statistics value of the unpaired t test was 6.54 with p value 0.000. Hence, it signifies that there is marked difference in the average score after application of aloe vera pulp along with the provided nursing care in the experimental group than the control group whereonly nursing care was provided.

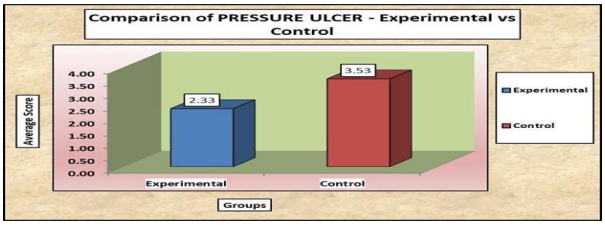
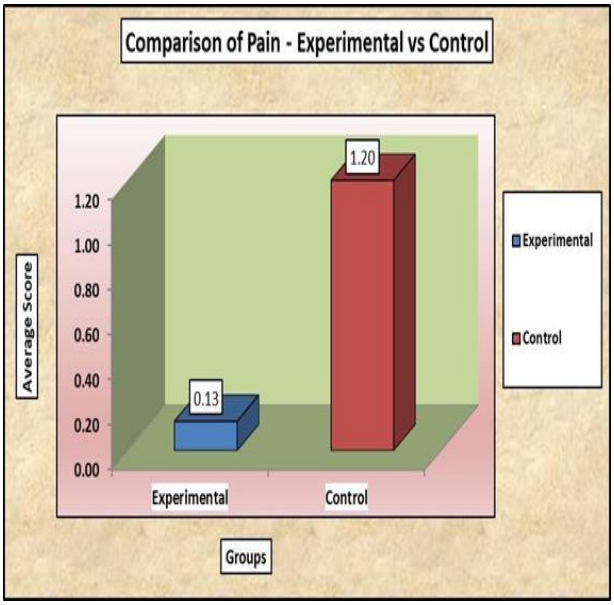


Table 7: Comparison of the pain level – Experimental Group (paired t test)

The comparison of pre-test and post-test average pain level in experimental group was done by the paired t test. The pre-test average score was 1.33 with standard deviation of 0.61. The post-test average score was 0.13 with standard deviation of 0.35. The test statistics value of the paired t test was 8.29 with p value 0.000. The p value less than 0.05, hence reject the null hypothesis. Shows that, use of aloe vera pulp was effective in relieving pain caused due to 1st degree pressure ulcer.

Table 8: Comparison of the pain level – Exp. vs. Control (Unpaired t test)

Table No. 8 shows the comparisons of post-test means of pain level among bed ridden patients in experimental and control groups were done by unpaired t test. The post-test average pain level of experimental group was 0.13 with standard deviation of 0.35. The post-test average pain level of control group was 1.20 with standard deviation of 0.41. The test statistics value of the unpaired t test was 7.60 with p value 0.000. This demonstrates that the use of aloe vera pulp on reducing the pain level at the 1st degree pressure ulcer area among bed ridden patients was effective.



Discussion

In one of the study conducted by Lotfolah Afzali et al (2020) which is a systemic review and meta-analysis study on the incidence of pressure ulcers and its associations in different wards of the hospital report that the highest incidence of pressure ulcer was seen among patients admitted in orthopaedic surgery unit.[11] These findings are consistent with the study as, most of the samples that were involved in the study were of skeletal system disorders with 40 % each in experimental and control group.

The findings regarding pain are similar to the study conducted by Davood Hekmatpou et al (2016) has mentioned that a mild pain emerged in pressure ulcer degree 1 and is more in the control group in whom the application of aloe vera pulp was not done, than in the intervention group. Pain reduction in the intervention group could be due to the effects of the use of Aloe Vera in the areas under study, also mentions that previous studies have confirmed the analgesic and anti-inflammatory properties of Aloe Vera and is able to reduce pain in the areas under study. [12]

Conclusion

After the main study it was noticed that the application of aloe vera pulp along with the daily nursing care, over the 1st degree pressure ulcers was effective in reverting the condition of affected skin and also it helps in reducing pain. As the stage 1 pressure ulcer is reversible it would have healed completely. However, few factors that were responsible for causing the pressure, and at certain times avoid friction and prevent moisture (use of various splints, strict immobilization, obesity, patient refuses moving in bed/ not cooperative, giving & removing bedpans, use of diapers etc.), also there was a short time for the study, but if the interventions were given for longer period of time along with the removal of factors responsible for causing pressure ulcer, it would have healed completely. Healing was seen in both experimental and control group samples, but comparatively the samples included in interventional group had rapid healing as there was aloe vera pulp applied over the 1st degree pressure ulcer area along with the daily nursing care. Hence, it can be said that the intervention was effective. The samples included were satisfied with the intervention as it was non-medicated and is also a cheapest & natural source of treating the pressure ulcers.

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Conflict of Interest
No conflict of interest involved.
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