Effect of Nursing Intervention Guidelines on Wound Status Outcomes for Patients Undergoing Negative Pressure Wound Therapy

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Abstract

Background: Negative pressure wound therapy is a highly effective treatment method that is well acknowledged for its diverse benefits in accelerating the healing of wounds. Smooth incorporation of nursing guidelines for patients with negative pressure wound therapy plays a crucial role in reducing problems and maximizing therapeutic results on wound status outcomes. **Aim:** This study aimed to evaluate effect of nursing intervention guidelines on wound status outcomes for patients undergoing negative pressure wound Therapy. **Materials and Methods:** A quasi-experimental design was used. A purposive sample of 50 adult patients undergoing negative pressure wound Therapy diagnosed with chronic wounds in the inpatient surgery department at Suez Canal University Hospital. Data were collected using the Patients' Profile questionnaire, and Bates-Jensen Wound Assessment questionnaire. **Results:** The mean age of patients was 54.60±13.49. There was a statistically significant improvement in total wound status score in the post- and follow-up interventions compared with pre-intervention, with mean scores of 30.34 and 18.78 in both post- and follow-up compared with a mean value of 46.32 in preintervention with a P value <0.001* in a patient with negative pressure wound therapy. Also, there was a significant improvement across all wound status outcome parameters. Moreover, parameters like size and epithelialization demonstrated the most considerable changes with a substantial mean reduction from 3.86 and 4.30 (pre-intervention) respectively to 1.40, and 1.82 (follow-up), accompanied by substantial effect sizes ranging from1.4 to 2.9 and 2.0 to 3.3.respectively. **Conclusion:** There was a significant improvement in the total wound status outcome score in the post and follow-up interventions compared with pre-interventions in patients with negative wound therapy. Educational guidelines were effective for the improvement of wound status outcomes. **Recommendations:** Nursing intervention guidelines for patients with negative pressure wound therapy should be implemented regularly as a key to improving wound status outcomes.

Keywords: Negative pressure wound therapy, wound status, nursing guidelines.

Introduction

Wound management is a frequently encountered and often complex aspect of surgical treatment. Wounds of all kinds, particularly those that do not heal, are among the most prevalent surgical diseases. Regardless of the management provided, persistent wounds pose significant challenges for patients. They cause discomfort and are sensitive to touch. Wounds frequently exude fluids and release unpleasant smells, while the bandages used to cover them are also easily noticeable. Without a complete skin covering, these wounds are vulnerable to injury and can increase in size. They may acquire an infection that can progress to sepsis and necessitate amputation. There is a significant and growing prevalence of chronic wounds. Chronic wounds are associated with substantial illness, death, and expenses in healthcare **(Eriksson et al., 2022).** Several cutting-edge methods of wound dressing have been implemented to facilitate rapid and trouble-free wound healing. The Vacuum Assisted Closure (VAC) method is one example of such a technique **(Ahmed et al., 2019).**

Negative pressure therapy (NPT) is an

increasingly popular treatment for complicated wounds. Negative pressure therapy (NPT), often referred to as vacuum-assisted closure therapy (VAC), is a non-invasive method that facilitates wound healing by delivering targeted negative pressure to the lesion. It is utilized in both inpatient and outpatient settings. The airtight system creates a closed and humid environment that facilitates the removal of excess fluids, hence enhancing the healing process of the wound. The purpose of this approach is to facilitate the healing of the wound by facilitating the transition of the lesion from the inflammatory to the proliferative phase when the wound does not heal by primary intention **(Astasio-Picado et al., 2022).**

Negative Pressure Wound Therapy (NPWT) is a minimally invasive technique that utilizes negative pressure to manage and absorb exudate. The dressing, which is coupled with foam and connected to a negative pressure device and vasculature, effectively inhibits both internal and external infection of the wound surface. NPWT can mitigate cross-infection by regulating many variables that delay wound healing and enhance peripheral microcirculation, hence promoting angiogenesis. Moreover, it facilitates the accelerated formation of small particles and the regrowth of epithelial tissue in wounds, diminishes the number of germs present, and enhances the oxygen supply to the surrounding tissue **(Burhan et al., 2022)**.

Negative pressure wound therapy (NPWT) is a well-established technique used to treat open wounds of different causes. It is increasingly recognized by nurses who manage chronic wounds. By applying a controlled vacuum to the affected area, NPWT enhances blood flow in the wound, leading to faster migration of fibroblasts. Additionally, it reduces bacterial count and exudate, thereby accelerating the wound-healing process. To guarantee the method's efficacy, it is imperative to uphold negative pressure within the wound, along with the careful management of various components of Negative Pressure Wound Therapy (NPWT). Additionally, it is crucial to assess the therapy's efficiency and provide relevant information on the patients **(Bazalinski et al., 2018).**

The healing process can be complex, as certain acute wounds may not heal properly and instead become chronic. In cases where large wounds are not effectively treated, there is a correlation with the presence of multiple comorbid conditions, prolonged hospital stays, potentially life-threatening complications, and an elevated risk of premature death. The process of healing wounds, regardless of whether they are acute, chronic, or complex, remains a significant challenge for wound care specialists and poses a substantial cost burden on healthcare systems worldwide, including Egypt. Integration of knowledge and talents from several nursing subspecialties is required for the application of negative pressure wound therapy (NPWT) in various types of wounds, including acute, chronic, closed incisional, closed skin graft, and open abdominal wounds. NPWT has the potential to generate financial savings by shortening hospital stays and accelerating patient recovery **(Sheta & Science, 2020).**

Efficient wound care treatment necessitates a collaborative approach including multiple disciplines, wherein nurses have a crucial responsibility in executing evidence-based therapies. Multiple studies have demonstrated significant enhancements in wound healing and decreased duration of hospital stays. Therefore, healthcare professionals must cooperate to create and execute evidence-based nursing intervention guidelines for patients undergoing NPWT, aiming to enhance outcomes and improve the quality of care **(Tuuli et al., 2020).**

Non-healing surgical wounds can cause significant anguish to patients and have adverse effects on their physical, social, emotional, and economic well-being. In 1995, negative pressure wound therapy was advised as a treatment for non-healing wounds. Negative pressure wound therapy is advised for a wide variety of injuries, such as open abdominal wounds, open fractures, burn wounds, pressure ulcers, post-traumatic wounds, diabetic foot ulcers, and sternal wounds. Prophylactic use of negative pressure wound therapy is becoming more common for closed incisional wounds to minimize surgical site problems. It is also utilized for wounds healing by secondary intention, such as chronic or infected wounds **(Norman et al., 2020)**

The principal objective of nursing care is to precisely evaluate and avoid wound complications through the use of suitable measures. Nevertheless, among patients who have previously experienced wound-related issues, the implementation of Negative Pressure Wound Therapy (NPWT) has been shown to decrease both morbidity and death rates. The collective endeavor of nurses is crucial for achieving optimal results. Therefore, it is crucial for a nursing care clinical practice to establish intervention guidelines to aid patients with Negative Pressure Wound Therapy (NPWT) in preventing and treating wound complications, which pose a significant barrier to patient care **(AbouZaid et al., 2020).**

Significance of the study

Efficient wound care management is crucial for reducing problems and facilitating healing, particularly for patients undergoing negative pressure wound therapy. The significance of nurses in delivering evidence-based therapies cannot be neglected. By implementing targeted nursing interventions, nurses can enhance wound status results and guarantee successful healing for patients **(Tuuli et al., 2020).**Study aimed to fill a gap in the current literature by conducting research on Negative Pressure Wound Therapy (NPWT), which has been relatively understudied.

One method for improving wound healing is NPWT, or negative pressure wound therapy. Despite the promising benefits of NPWT, there is a lack of extensive study on the topic, making it difficult to draw firm conclusions about its effectiveness and how it could be applied in different clinical settings, Therefore, it is crucial for a nursing care clinical practice to establish intervention guidelines to aid patients with Negative Pressure Wound Therapy (NPWT) in preventing and treating wound complications, which pose a significant barrier to patient care

Aim of the study

This study aimed to evaluate effect of nursing intervention guidelines on wound status outcomes for patients undergoing negative pressure wound Therapy

Research Hypotheses:

H0: There is no significant improvement in wound status outcomes for patients undergoing negative pressure wound therapy after the implementation of nursing intervention guidelines.

H1: There is a significant improvement in wound status outcomes for patients undergoing negative pressure wound therapy after the implementation of nursing intervention guidelines.

Operational Definition:

Wound status outcome on negative pressure therapy is defined as the wound healing and wound size, as measured by wound depth, width, and length, and a granulation tissue formation, exudate production and peripheral tissue edema.

Subjects and method

Research design:

The study was to assume a quasi-experimental design (nonequivalent, pre-posttest design, time series). The quasi-experimental research design involved manipulating the independent variable to observe the effect on the dependent variable. The pre-test and post-test results help establish the effectiveness of the intervention measures proposed in the research **(Polit & Beck, 2017)**

Technical design:

Setting:

The study was conducted in the inpatient surgery department at Suez Canal University Hospital. The inpatient surgery department is Located on the right side, second floor of the hospital buildings which is divided into 10 rooms, each room contains four beds.

Subjects

The participants of the study were a purposive sample of 50 adult patients undergoing negative pressure wound Therapy diagnosed with a chronic wound, cognitively aware and willing to participate in the study are potentially eligible for participation. Participants taking steroids, other immunosuppressive, anticoagulant therapy, bone infections, malignant disease in wound, communication impairment, and mentally disordered were excluded

Required sample size

Using the G power version3.1 with a moderate effect size (Cohen's d = 0.5), a power of 0.90, and an alpha level of 0.05, two-tailed test, the actual sample size will be 44, and after adding 10% dropout, a total sample size was 50

Tools:

Tool 1- Patients' Profile Questionnaire:

This tool was developed by the researchers based on a recent literature review. It was used to assess patients' status and includes the following parts:

Part I: Demographic data: Included the following data; patient's age, sex, marital status,educational level, and occupation.

Part II: Patient Medical data: Included associated medical disease, and type of surgery.

Tool II: Bates-Jensen Wound Assessment (BWAT) contains 13 items assessing the size, depth, edges, undermining, type and amount of necrotic tissue, type and amount of exudate, peripheral tissue edema, and induration, skin color surrounding the wound, granulation tissue, and epithelialization. The measuring scale was a five-point Likert type, where 1 indicated the best condition of the wound and 5, the worst condition. The total score was obtained as the sum of all the items and can range from 13 to 65 points, with higher scores indicating the worst wound conditions. Items such as size, depth, edges, and detachment should be scored as zero when the lesions are healed. Also, the tool contained two additional items - location and shape – which were not part of the total score **(Harris et al., 2010).** The BWAT had satisfactory validity and reliability indices, with a Cronbach's alpha of 0.90, sensitivity of 61%, specificity of 52%, and a positive predictive value of 65% **(Alves et al., 2015).**

Validity and Reliability:

The two tools of data collection were tested for their content validity with a content validity index of 0.86. Comprehensiveness and applicability by the expertise of two medical and three nursing experts were done to determine whether the included items were comprehensive, understandable, applicable, clear, and suitable to achieve the aim of the study. Also, back translation was done for research tools. The coefficient of reliability of the evaluating tool was measured by Cronbach's alpha with Cronbach's alpha .890.

Pilot study:

A pilot study was carried out on 10% of the total study sample to test the clarity and practicability of the tools and estimate the needed time to fill in each form.

Fieldwork: The study was conducted from June 2023 to November 2023 through the following four phases:

Preparatory and planning phase: Approval was obtained from the head of the general surgery department at Suez Canal University Hospital, and by the submission of a formal letter from the Faculty of Nursing, Suez Canal University Hospital University. Meetings and discussions were held between the researcher and the nursing administration to make them aware of the aims and objectives of the study, as well as, to get better cooperation during the implementation phase of the study. Based on the information obtained from the pilot study, in addition to the recent related literature, the researcher designed an

intervention nursing guidelines. A group of three medical-surgical nursing professors discuss educational nursing guidelines. Some adjustments were made based on the expert panel's feedback, which was tested on a 5-point Likert scale with a content validity index of 0.78, before the final frame was constructed.

Assessment phase: This phase included collecting baseline data, and the study sample was recruited according to the set criteria. The patient Profile questionnaire was used to assess patients' status of negative pressure wound therapy, and the BWAT Scale was used to assess wound status. The researcher interviewed the patients and obtained their written consent to be recruited in the study after explaining the aim of the study. The time to fill study tools was 30-45 min. (Pre-test phase).

Implementation phase: Guidelines implementation phase: The researcher was available in the morning shift at the clinical field for three days /week. The technique of implementing nursing intervention guidelines for patient with vacuum therapy involved assessing and monitoring patients, checking the safety of the environment and equipment, following infection measures and aseptic technique, removing old dressing, cleaning, assessing, and measuring wounds, cutting, and foam dressing, trimming dressing drape and applying negative pressure, and patient education regarding negative pressure wound therapy. The interventional guidelines were conducted with patients every 3days for each patient. Patients were allowed to ask questions, explain, or elaborate in case of misunderstanding.

Evaluation phase: At the end of the interventional guidelines, evaluation was done to assess the patient's profile, and wound status using the same data collection tools, and comparing the results of the data collected to the pretest results to evaluate the effectiveness of the nursing interventional guidelines posttest (after 2 weeks) and follow up (after 1 month).

Administrative design: An official letter from the faculty of nursing was submitted to authorities of the outpatient cardiac clinic at Suez Canal University Hospital and the head of the inpatient departments in the hospital. Permission to carry out the study was obtained from the director of the setting after an explanation of the purpose of the study.

Ethical considerations

Before recruitment and data collection, approval was obtained from all the applicable Research/Ethics Committee/Boards (215:6/2023), a written consent was secured from each subject after being informed about the nature, purpose, and benefits of the study. Subjects were also be informed that participation is voluntary and about their right to withdraw at any time without giving reasons. Confidentiality of any obtained information was ensured through the coding of all data. The researchers reassured Subjects that the data would be used for only the research purpose.

Statistical design:

The Windows-based SPSS Version 23 was used for the investigation. The numbers and percentages were used to indicate categorical measures and numerical metrics. Mean and SD characterized normally distributed variables. Personal characteristics, and wound-related data using descriptive statistics. The research and control groups' homogeneity and differences in individual characteristics were assessed using the chi-square test. This study compares the mean wound status outcome scores of study and control group patients. The comparison used repeated measures and pre-post-follow-up nursing intervention guidelines. The analysis of variance (ANOVA) was used to compare the two groups using partial eta squared ($\eta 2$) as the effect size measure. Multiple comparisons were corrected using the least significant difference (LSD) approach, which is equivalent to no changes. The Cohen's d effect size (d) was used to compare the control and study groups at each period. A p-value of 0.05 or less is statistically significant.

Results:

Table (1): The study results revealed that 46% of the study sample was more than 60 years old, followed by age between 50 to less than 60 years old with 26% percentage. 58% of the study sample was married. As regards level of education, 24% of the sample had secondary

education, followed by high education with a percentage of 22%. Also, 70% of the study sample wasn't working.

Table (2): The study results showed that 36% of the study sample had a bed sore diagnosis, followed by an abscess (16%), and amputation (14%). with regard location of the wound, 24% had an abdominal wound, followed by a gluteal wound (12%). Also, 46% of the wound was round, and 24% was elongated in shape.

Table (3) reveals that there was a statistically significant improvement in total wound status score in the post- and follow-up interventions compared with pre-intervention, with mean scores of 30.34 and 18.78 in both post- and follow-up, respectively, compared to pre-intervention (46.32). Also, there was a large effect size in follow-up intervention compared with pre-intervention with an effect size of 3.5, post-intervention compared with pre, and follow-up intervention with an effect size of 1.8. Regarding wound outcome parameters, there was a statistically significant improvement in all wound items post-intervention and follow-up intervention compared with pre-intervention, with a P value of .001*. Items got a large effect size in post-intervention compared with preintervention epithelialization and peripheral tissue induration with effect sizes 2, and 1.7respectively. Items that had a large effect size in follow-up intervention compared with preintervention were epithelialization, peripheral tissue induration, and size, with effect sizes of 3.5, 3.1, and 2.9, respectively. Also, items that got large effect sizes in follow-up intervention compared with post-intervention were necrotic tissue type, size, and peripheral tissue induration with effect sizes of 1.7, 1.5, and 1.5, respectively.

Figure (1) illustrates that there was a significant improvement in the total BWAT score in the post- and follow-up interventions compared with pre-interventions, with a small 95% confidence interval and no overlapping between the three times.

Table (1): Percentage distribution of the studied patients according to their profile (n=50)

Variables	Total Sample (n=50)	
	N	%
Age (Years)		
20:<30	2	4.0
30:<40	8	16.0
40:<50	4	8.0
50:>60	13	26.0
≥60	23	46.0
Mean±SD (range)	54.60±13.49(20-75)	
Gender		
Male	24	48.0
Female	26	52.0
Marital status		
Single	5	10.0
Married	29	58.0
Divorced/widowed	16	32.0
Education		
Illiterate	8	16.0
Read and write	7	14.0
Primary	10	20.0
Secondary	12	24.0
High	11	22.0
Post graduate	2	4.0
Working		
Yes	15	30.0
No	35	70.0

Table (2): Percentage distribution of the studied patients according to their wound-related data (n=50)

	N	%
Diagnosis		
Abscess	8	16.0
Amputation	7	14.0
Bed-Sore	18	36.0
Diabetic Foot	1	2.0
Gangrene	4	8.0
Post Exploration	2	4.0
Post-Cholecystectomy	3	6.0
Post-Herniectomy	3	6.0
Trauma	4	8.0
Location of wound		
Tarsal	1	2.0
Abdomen	12	24.0
Above Knee	4	8.0
Ankle	1	2.0
Back	4	8.0
back Knee	1	2.0
Below Knee	2	4.0
Gluteal	7	14.0
Foot	1	2.0
Lateral Femur	1	2.0
lateral Side knee	1	2.0
Lt Ankle	1	2.0
Lt Hip	1	2.0
LT Thigh	1	2.0
LT Tibia	2	4.0
Metatarsal	1	2.0
Middle Toe Finger	1	2.0
Perineal area	1	2.0
RT Forarm	1	2.0
RT Hip	2	4.0
RT Thigh	1	2.0
Scrotum	1	2.0
Thigh	1	2.0
Trochanter	1	2.0
Shape		
Elongated	12	24.0
Irregular	8	16.0
Regular	3	6.0
Rectangle	4	8.0
Round	23	46.0

Table (3): **mean scores of wound status outcomes parameter for studied patient with negative pressure wound therapy (pre-post-follow up) (n=50).**

Wound items	Pre	Post (2 weeks)	Follow up (one month)	F test	P1	P2	P3
	Mean±SD	Mean±SD	Mean±SD	Pvalue (η^2)	d	d	d
1. **Size**	3.86±.926	2.52±.909	1.40±.67	333.22 <.001* (.872)	<.001 1.4	<.001 2.9	<.001 1.5
2. **Depth**	3.46±.956	2.24±.822	1.34±.519	317.85 <.001* (.866)	<.001 1.3	<.001 2.4	<.001 1.3
3. **Edges**	3.56±.972	2.32±.844	1.42±.673	294.44 <.001*(.857)	<.001 1.3	<.001 2.4	<.001 1.3
4. **Under-mining**	3.24±.197	2.22±.162	1.76±1.1	117.33 <.001* (.705)	<.001 0.7	<.001 1.1	<.001 0.5
5. **NecroticTissue Type**	3.72±.927	2.32±.653	1.18±.438	275.25 <.001* (.849)	<.001 1.5	<.001 2.7	<.001 1.7
6. **NecroticTissue Amount**	3.26±.922	2.14±.857	1.18±.388	207.22 <.001* (.809)	<.001 1.2	<.001 2.3	<.001 1.1
7. **ExudateType**	3.96±1.009	2.56±.541	1.54±.503	396.79 <.001* (.882)	<.001 1.4	<.001 2.4	<.001 1.9
8. **ExudateAmount**	3.68±.891	2.54±.862	1.64±.851	540.24 <.001* (.917)	<.001 1.3	<.001 2.3	<.001 1.0
9. Skin surrounding wound	3.08±.922	1.96±.781	1.30±.463	224.25 <.001* (.821)	<.001 1.2	<.001 1.9	<.001 0.8
10. **PeripheralTissue Edema**	3.24±.847	1.98±.589	1.22±.465	265.10 <.001* (.844)	<.001 1.5	<.001 2.4	<.001 1.3
11. **Peripheral Tissue Induration**	3.06±.586	2.04±.533	1.22±.418	401.90 <.001* (.891)	<.001 1.7	<.001 3.1	<.001 1.5
12. Granulation Tissue	3.90±.789	2.74±.803	1.76±.744	385.85 <.001* (.887)	<.001 1.5	<.001 2.7	<.001 1.2
13. Epithelialization	4.30±.763	2.76±.771	1.82±.774	552.34 <.001* (.919)	<.001 2.0	<.001 3.3	<.001 1.2
14. Total score	46.32±7.96	30.34±6.37	18.78±4.68	1390.52 <.001* (.996)	<.001 2.0	<.001 3.5	<.001 1.8

F is repeated measures ANOVA test; P value is significant <05; P1 is pre versus post; P2 is P1 versus P3. P3 is P1 versus P3; the Bonferroni post hoc test is used for pairwise comparison, η^2 is partial eta squared effect size and d is Cohen's d effect size.

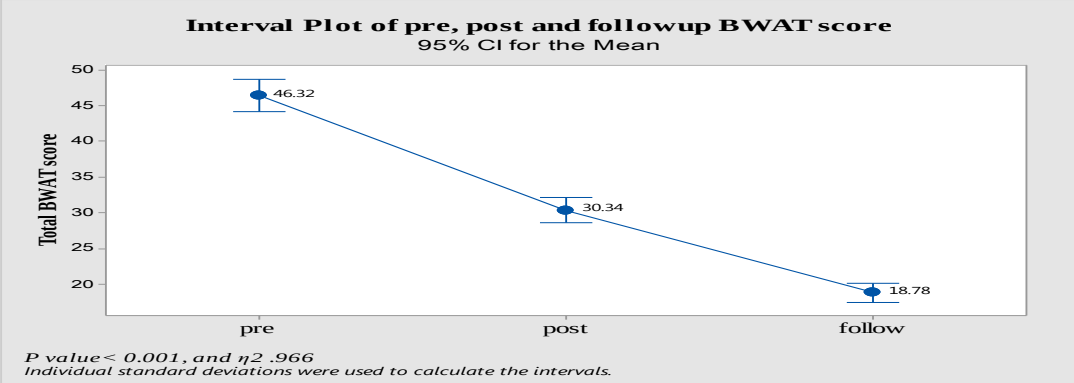

Figure (1): Total mean score and 95% Confidence interval of wound status outcomes parameter for a studied patient with negative pressure wound therapy (pre-post-follow up) (n=50).

Discussion:

Wound care is a prevalent and often challenging responsibility. Dressing is an essential component of wound management. Throughout history, dressing techniques have been consistently assessed and analyzed because of their importance in facilitating wound healing and potential effects. Modern methods for wound dressing have been developed to help wounds heal quickly and completely. One of the approaches used is negative wound therapy (NPWT), which is a very successful therapeutic strategy known for its various advantages in acceleration of wound healing. Scientific research emphasizes the crucial function it serves in preserving optimal wound conditions **(Ahmed et al. 2019)**.

Extensive research on medical interventions prioritizes the examination of their effect on patients and the ability to alleviate the suffering. Given that nurses are primarily responsible for managing wound care in clinical environments, wound care must be considered a fundamental aspect of nursing care. Nurses must possess current knowledge and proficiency in wound care device teaching and application, as a result of the notable progressions in wound care. Negative wound pressure therapy (NPWT) is an innovative approach that has shown impressive effectiveness. This strategy is highly effective and is supported by data as a best practice in nursing care **(Patel, 2022).**

Regarding the demographic features of the studied patients, the average age was 54.60±13.49. More than half of the sample was married. In terms of educational level, the majority of the sample had completed secondary school. The findings of this investigation were consistent with those of **Hassan et al. (2021)**, who examined the demographic parameters of the patients and reported a mean age of (53.8±9.6) years. The survey revealed that the majority of patients were married and had completed secondary education. However, this contradicted **Hussein et al., (2020)** who reported that the majority of patients were 60 years old or older.

Regarding wound-related data, the study findings revealed that the largest proportion of the study population was diagnosed with bed sores, followed by abscesses and amputations. This study aligns with the research conducted by **Zens et al., (2020)**, which revealed that the majority of wounds in the study sample were pressure ulcers, followed by amputation wounds and fasciotomy wounds. Research findings illuminate the efficacy of Negative Pressure Wound Therapy, a versatile approach to wound management that may be applied to various types of wounds. According to **Anghel and Kim (2016)**, it is beneficial for both naturally healing open wounds and closed wounds that need stitches or sutures for healing.

With regards to wound status outcome parameters, there was a significant decrease in wound size, depth, and edge post and follow-up intervention guidelines compared to before the intervention for patients who had negative wound pressure therapy. This was consistent with the findings of **Hassan et al. (2021)** in their study on the Effects of Nursing Program

on Vacuum-Assisted Closure Therapy versus Traditional Wound Dressing. They observed a significant improvement in patient outcomes when using Vacuum-Assisted Closure therapy compared to traditional wound dressing. Specifically, the application of the nursing program resulted in a notable reduction in the severity of wound deterioration among patients. From the researcher's perspective, this finding highlights the significance of nursing care intervention guidelines in enhancing the therapeutic efficacy of negative pressure wound therapy for wound status outcomes, particularly in terms of wound healing.

Furthermore, this finding aligned with the study conducted by **Elshenawie et al. (2016)**, which demonstrated a statistically significant reduction in the percentage of wound size post-intervention, as opposed to before the intervention. Furthermore, **Al-Mallah et al. (2018)** highlighted a noteworthy reduction in wound size among patients who underwent negative pressure wound care after the intervention, with statistical significance. Furthermore, **Ahmed et al. (2019)** provided evidence to support the notion that the application of negative pressure to tissues leads to tissue deformation, which in turn strains individual cells. This stretching process is believed to stimulate cell proliferation in the wound microenvironment. Utilizing micromechanical forces can be an effective approach to enhance wound healing by stimulating cell division, angiogenesis, and the release of growth factors.

In terms of wound status outcome parameters, there was a statistically significant improvement in granulation tissue and epithelialization post and follow-up of the intervention guidelines, specifically for patients undergoing negative pressure wound therapy. From the researchers' perspective, the study's findings demonstrate the crucial roles of nursing intervention guidelines in enhancing wound assessment and managing negative pressure devices. These guidelines contribute to improving wound granulation by ensuring effective negative pressure maintenance and unobstructed drainage.

These results aligned with the findings of **Yu et al. (2023)** in their study titled "In-hospital nursing care intervention enhancing the efficacy of vacuum sealing drainage in wound healing." who found that active nursing care is useful in facilitating adjustment to the optimal negative pressure, ensuring efficient drainage of negative pressure, and enhancing wound healing. This indicates that negative pressure wound therapy (NPWT) technology is extensively employed in clinical settings due to its ability to directly engage with the wound from all angles, promptly eliminate metabolites and toxins, prevent cross-contamination, and successfully enhance the formation of granulation tissue and wound healing. These results could be explained by **Astasio-Picado et al., (2022)**, **Miyanaga, et al., (2022)** that NPWT keeps the wound moist, getting rid of harmful bacteria, reducing inflammation, and improving blood flow and oxygen supply to the wound. These actions promote important processes like the formation of new blood vessels (angiogenesis) and the growth of new tissue granulation in the wound bed.

Regarding the total wound outcome score, the study results showed a statistically significant improvement in the wound status outcome score post- and follow-up interventions, compared to before the intervention guidelines, in patients undergoing negative wound therapy. In line with **Hassan et al., (2021)**, who discovered that negative pressure wound therapy led to a noteworthy enhancement in the overall mean wound healing for patients, whose research elucidated that VAC therapy creates a sterile and regulated setting, which reduces the time required for wound healing and serves as a viable alternative for treating soft tissue injuries resulting from trauma.

Similarly, **Burhan et al. (2022)** emphasized that nursing care is crucial in the application of advanced treatments such as Negative Pressure Wound Therapy (NPWT) for long-lasting wounds. The implementation of NPWT has demonstrated potential in improving microcirculation and accelerating the healing process. Nevertheless, the successful implementation of this requires the proficiency of experienced wound nurses. These

professionals not only carry out the procedure processes but also provide thorough patient care. They provide a dual function, guiding patients regarding device care and troubleshooting, while simultaneously assessing the effectiveness of the treatment. Their expertise and meticulousness greatly enhance the effectiveness of NPWT, guaranteeing that patients receive optimal care and assistance during the healing process.

The study findings confirmed that the nurse intervention guidelines significantly improve the efficacy of NPWT by skillfully adjusting and modifying the vacuum settings to meet the specific needs of both the wound and the patient. Nurses play a vital role in proficiently managing NPWT equipment, ensuring its proper functioning, and regularly evaluating the wound site to maintain an optimal therapeutic environment. The continuous integration of nursing proficiency in the implementation of NPWT is essential for minimizing complications, optimizing therapeutic outcomes, and ensuring patient safety and comfort throughout the treatment process.

Conclusion:

There was a significant improvement in the total wound status outcome score in the post and follow-up interventions compared with pre-interventions in patients with negative wound therapy. There was a statistically significant decrease in wound size, depth, and edge post and follow-up intervention guidelines compared to pre-intervention for patients with negative wound pressure therapy. There was a statistically significant improvement in granulation tissue and Epithelialization post and follow-up intervention guidelines.

Recommendations:

1.Nursing intervention guidelines for patients with negative pressure wound therapy should be implemented regularly as a key for improving wound status outcomes.

2.Continuous and regular monitoring of wound status outcome parameters for patients with negative pressure wound therapy as a standard of care.

3.Further studies focus on comparing the efficacy of negative pressure wound therapy with other wound dressing technologies.

4.Further studies on factors affecting wound status outcomes.

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