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EFFECTIVENESS OF HYDROCOLLOID USE ON WOUND HEALING PROCESS IN WOUND PATIENTS AT HANIFAH MEDIKA CENTER PRIMARY CLINIC

Efektivitas Penggunaan *Hydrocolloid* Terhadap Proses Penyembuhan Luka pada Pasien Luka di Klinik Pratama Hanifah Medika Center

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ABSTRACT
Wounds due to tissue damage can be caused by pressure, friction, extreme temperatures, or infection. WHO from 2022 recorded a wound prevalence of 3.50 per 1000 population, with the majority of cases resulting from surgery or trauma (48%). In Indonesia, around 35% of the population experiences wounds, with pressure ulcers reaching 20%. Nurses play a crucial role in wound care, including the selection of appropriate dressings. Hydrocolloid is a modern dressing that protects wounds from water, air, and bacteria, and creates a moist environment to accelerate healing. This study evaluates the effectiveness of Hydrocolloid in accelerating the wound healing process at the Hanifah Medika Center Primary Clinic. Aim to examine the effect of using the hydrocolloid on wound healing process in wound patient at Hanifah Medica Center clinic. Methods This study was a quantitative design with the Quasi-Experiment methode without a Control Group Pre-Test - Post-Test. In this design, the intervention is given to one group without a control group for comparison. Results: The results showed that mean of pre-test Winner scale score of 28.23 ± 3.093 and a post-test score of 15.63 ± 3.090. The research results indicate a difference in the Winner scale assessment scores between the pre-test and post-test, with a P-value of 0.000 (p-<0.05). Conclusion There was a decrease in wound assessment scores using the Winner scale, with a pre-test score of 28.23 ± 3.093 and a post-test score of 15.63 ± 3.090. which means that the use of Hydrocolloid is effective in the wound healing process. Suggestion: It is suggested that nurses, healthcare institutions, and wound patients can use Hydrocolloid as a dressing continuously. The three of them become one of the efforts in the wound healing process.

Keywords: *Hydrocolloid, Wound, Winner scale Bibliography*

ABSTRAK
Luka akibat kerusakan jaringan dapat disebabkan oleh tekanan, gesekan, suhu ekstrem, atau infeksi. Data WHO 2022 mencatat prevalensi luka sebesar 3,50 per 1000 penduduk, dengan kasus terbanyak akibat pembedahan atau trauma (48%). Di Indonesia, sekitar 35% penduduk mengalami luka, dengan luka tekan mencapai 20%. Perawat berperan penting dalam perawatan luka, termasuk pemilihan balutan yang sesuai. *Hydrocolloid* merupakan balutan modern yang melindungi luka dari air, udara, dan bakteri serta menciptakan lingkungan lembab untuk mempercepat penyembuhan. Penelitian ini mengevaluasi efektivitas *Hydrocolloid* dalam mempercepat proses penyembuhan luka di Klinik Pratama Hanifah Medika Center. Tujuan penelitian mengetahui efektivitas penggunaan *Hydrocolloid* terhadap proses penyembuhan luka pada pasien luka di Klinik Pratama Hanifah Medika Center. Penelitian ini menggunakan desain kuantitatif dengan metode *Quasi- Experiment without Control Group Pre-Test - Post-Test*. Dalam desain ini, intervensi diberikan pada satu kelompok tanpa kelompok kontrol sebagai pembanding. Hasil penelitian diperoleh rata-rata skor *Winner scale pre-test* sebesar 28,23 ± 3,093 dan *post-test* sebesar 15,63 ± 3,090. Hasil penelitian menunjukan adanya perbedaan skor pengkajian Winner scale *pre-test, post-test* dengan nilai *p-value* sebesar 0,000 (p-

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<0,05). Simpulan dalam penelitian ini yaitu ada penurunan skor pengkajian luka menggunakan *Winner scale pre-test* sebesar 28,23 ± 3,093 dan *post-test* sebesar 15,63 ± 3,090. yang bermakna penggunaan Hydrocolloid efektif terhadap proses penyembuhan luka. Saran dalam penelitian ini diharapkan perawat, instansi pelayanan kesehatan dan pasien luka dapat menggunakan Hydrocolloid sebagai balutan secara berkelanjutan. Ketiganya menjadi salah satu upaya dalam proses penyembuhan luka

Kata Kunci: *Hydrocolloid, Luka, Winner scale*

INTRODUCTION

A wound is a condition in which body tissue is damaged, characterized by a break in tissue continuity due to excessive pressure from sharp or blunt objects, friction, extreme temperatures, or infection. Based on their characteristics, wounds are divided into two types: open wounds and closed wounds. An open wound is a condition where the epithelial tissue and underlying layers are damaged, resulting in direct contact with the air. Meanwhile, a closed wound only causes damage to the inner epithelial tissue without direct exposure to the air (Ahnaf & Riyadi, 2024).

In 2022, the WHO (World Health Organization) reported an increase in cases of wounds, both acute and chronic. Research in America shows that out of every 1,000 people, approximately 3.5 experience injuries. Most cases are caused by surgery or injury (48%), foot wounds (28%), and wounds from continuous pressure (21%). Data from the American Wound Association records an annual incidence of 110–160 million surgical and trauma wound cases, 20–40 million abrasions, 10 million burns, and millions of cases of pressure ulcers, venous ulcers, diabetic ulcers, amputations, and skin cancer complications (Kurniasih, 2024). Wounds can occur in daily activities, such as abrasions from falling or cuts from sharp objects, which are classified as minor wounds (Murtiyani, Siswantoro, & Kushayati, 2024).

In Indonesia, approximately 35% of people have experienced wounds at some point. The main causes are surgery or injury (48%), leg wounds (28%), and wounds from continuous pressure (20%). This data confirms that wounds remain a significant health issue (Kusumaningrum et al., 2021). Beside wounds that heal quickly, many wounds that are difficult to heal also occur in Indonesia. In 2018, 4 million cases of diabetic foot ulcers and 89,500 cases of carcinoma ulcers were recorded (Harun, Purba, Fitri, & Widayat, 2024). In 2018, the prevalence of wounds in Indonesia reached 9.2%, with the most common types being abrasions, bruises, and contusions (64%), followed by lacerations and puncture wounds (20%), and burns (1.3%). West Java recorded the highest number of cases, with 186,809 cases disrupting activities and 16,150 cases affecting specific body parts (Mufidah, 2023).

Long-lasting wounds can affect various aspects of a patient's life, including self-concept, self-confidence, quality of life, and physical and emotional health. Wounds that are difficult to heal can also lower expectations for recovery and impact spirituality levels. Physically, potential complications include retinopathy, nephropathy, and neuropathy (Wulandari & Kurniawati, 2023). Based on healing time, wounds are divided into acute and chronic wounds. Acute wounds last less than 5 days and heal within 0–21 days thru the stages of hemostasis and inflammation. This wound appeared suddenly and healed normally, like an incision, burn, or puncture wound. Meanwhile, chronic wounds failed to go thru the normal healing process, so anatomical function and structure could not be optimally restored. Healing takes longer with persistent inflammation. Examples include diabetic ulcers, pressure ulcers, and foot ulcers (Kurniasih, 2024). As the wound begins to heal, the new tissue formation stage (proliferation or fibroplasia) occurs for about three weeks. This phase is also called the granulation phase, where new pink and shiny tissue forms in the wound. This tissue is formed from fibroblasts, inflammatory cells, fibronectin, hyaluronic acid, and new blood vessels. Fibroblasts increase in number and produce

collagen to close the wound. Additionally, granulation tissue containing fibroblasts, macrophages, and endothelial cells will replace fibrin. Fibroblasts also function to produce the extracellular matrix, which helps in scar formation and allows keratinocytes to close the wound. Macrophages release growth factors that help fibroblasts develop, move, and form the extracellular matrix. After that, keratinocytes from the epithelium around the wound migrate to close the wound surface thru epithelialization (Aji, 2024). The process of tissue formation in wound healing can be hindered by various factors, such as improper care, age, diet, lifestyle, self-care habits, medication adherence, stress levels, and physical activity. If this phase doesn't go well, the wound will take longer to heal. During the proliferation phase, the granulation tissue formed contains many new blood vessels, fibroblasts, macrophages, granulocytes, endothelial cells, and collagen. This tissue plays a role in the formation of the extracellular matrix and helps in the formation of new blood vessels in the wound area. Additionally, granulation tissue forms a supporting structure for cells to attach, migrate, proliferate, and undergo functional changes. If wound care is not performed correctly during this phase, the granulation tissue that forms can be disrupted, thereby prolonging the wound healing process and making the wound more difficult to heal (Aji, 2024).

Therefore, the proliferation phase is the focus of research related to wound healing.Although most wounds can heal with proper care, some cases can experience complications that lead to more serious conditions. Both acute and chronic wounds have the potential to lead to various complications that not only affect the patient's quality of life but also increase healthcare costs. Therefore, a deep understanding of the theory behind wound complications is crucial for medical personnel to design more effective prevention and management strategies (Saputra et al., 2024). Nurses play an important role in wound care, such as cleaning, changing bandages, and monitoring for signs of infection or other problems. This task requires not only skill but also an understanding of how wounds heal and the ability to teach patients how to care for their wounds properly. Understanding the types of dressings, how to maintain cleanliness, and special wound care is very important for wounds to heal quickly and without problems (Arisdiani & Arifin, 2024).

In this study, the type of modern dressing used is Hydrocolloid. This coating consists of carboxymethyl cellulose, water, and gelatin as a base, along with specific extracts as the active ingredient. Hydrocolloids have the ability to protect wounds from exposure to water, air, and bacteria, while also acting as a medium for autolytic debridement. Additionally, this dressing also has anti-inflammatory and antimicrobial properties, which can optimally support the wound healing process (Indriyani, 2024). Hydrocolloid can be used as a primary dressing in the proliferation phase because of its ability to create a moist wound environment that supports the healing process. This dressing helps with blood vessel formation, promotes skin cell growth, and accelerates the production of new tissue and collagen. Additionally, hydrocolloids also moisturize dead tissue, allowing wounds to clean faster and improve the healing process (Puspitasari, 2022).

In the study conducted by Huda et al. (2024) on the Effect of Hydrocolloid Dressing on the Healing of Diabetic Mellitus Wounds at the Alhuda Wound Care Clinic. This research proves that Hydrocolloid is very helpful in healing diabetic wounds. The results show that modern wound dressings, especially Hydrocolloid, have a significant impact on accelerating the healing of diabetic wounds. The research also found that wound care with Hydrocolloid should be performed every 2-3 days, making it an effective option for accelerating wound healing in diabetic patients. Based on research conducted by Hidayat et al. (2021) in a study titled "Literature Review of the Effectiveness of Modern Hydrocolloid Dressings on Wound Healing in Type 2 Diabetes Mellitus Patients," the research indicates that modern Hydrocolloid wound dressings aid in the wound healing process for type 2 diabetes patients. This research supports the effectiveness of using Hydrocolloid in creating a wound environment that is optimal, accelerates tissue regeneration, and reduces the

risk of complications during the healing process.

Based on the results of a preliminary study conducted by the researcher at Hanifah Medika Center Primary Clinic, data was obtained indicating that in November – December 2024, the number of patients undergoing treatment for acute and chronic wounds reached 33. Additionally, the results of interviews with nurses at the clinic provided information about the wound care trends at the clinic, which has been using modern dressings, as well as the factors influencing the effectiveness of the applied treatment methods. This data also serves as a basis for researchers to evaluate and analyze the effectiveness of using modern dressings, particularly Hydrocolloid, in accelerating the wound healing process and reducing the risk of complications.

MATERIALS AND METHODS

Hydrocolloid

Hydrocolloid is a waterproof dressing that prevents bacterial contamination. This dressing supports the proliferation phase by maintaining wound moisture, accelerating the formation of new blood vessels, and stimulating tissue and collagen formation. Hydrocolloid is a type of moisture-retentive wound dressing that contains gel-forming agents (such as gelatin, pectin, or carboxymethylcellulose) combined with an adhesive layer that sticks to the skin. When a hydrocolloid dressing comes into contact with wound exudate, it absorbs fluid and forms a soft gel, maintaining a moist environment that promotes faster healing and reduces pain. Characteristics of Hydrocolloid Dressing is Occlusive or semi-occlusive (protects wound from bacteria and contaminants) Self-adhesive and flexible. Can stay in place for several days (3–7 days depending on exudate). Gel formation indicates moisture balance and healing activity. Hydrocolloid dressings can effectively promote healing in clean, non-infected diabetic foot ulcers by maintaining a moist environment, encouraging granulation tissue formation, and reducing pain. However, they must be used with caution in infected or heavily exuding wounds**,** and always as part of comprehensive diabetic foot care (including glycemic control and off-loading).

Mechanism of Action

The hydrocolloid interacts with wound exudate, It swells and forms a gel-like layer over the wound, This gel keeps the wound moist, which promotes autolytic debridement (natural removal of dead tissue). It protects nerve endings, reducing pain and The moist environment enhances granulation tissue formation and epithelialization.

Wound healing process

A wound is damage to the skin that can affect anyone, with varying degrees of severity. Wounds can cause loss of organ function, bleeding, blood clotting, infection, and cell death. Wound healing is the biological process through which the body repairs damaged tissue after an injury such as a cut, burn, or ulcer. It's a complex, multi-stage process involving cells, growth factors, and structural proteins that restore the integrity and function of the skin or other tissues.

Wound Assessment

The tools used in this study include data on patient conditions and the Winner scale assessment sheet. The Winner scale is a tool adapted from the Bates-Jensen Score to assess and predict how quickly wounds heal, and it has been tested for accuracy, making it frequently used in hospitals or clinics. The Winner scale provides a value that describes the severity of the wound, where a higher score indicates a more serious wound condition. This scale includes 10 assessment aspects. It covers wound size, wound stage, wound edge condition, GOA (eroded area), skin color around the wound, swelling, newly formed tissue, skin healing process, and the type and amount of wound fluid (Nugroho, 2022). In this study, the Winner scale was used to assess the average wound healing score.

This research uses a quantitative design with a quasi-experimental method without a control group, with pre-test and post-test before and after the treatment. In this approach, the intervention is given to a single group without a control group for comparison. Measurements were taken before

and after the treatment to observe the changes that occurred due to the treatment (Sa'diyah, Rahmawati, & Ulwiyah, 2024).

A quasi-experiment is a semi-experimental study conducted in a real-world setting, not in a laboratory. Unlike pure experiments, this research was conducted in a community or field setting, so external variables could not be fully controlled by the researcher (Ilhami, 2022). The population in this study consists of 33 patients with stage 2-3 wounds who were treated at the Hanifah Medika Center Primary Clinic in November-December 2024. A sample is a portion of the population that is studied to represent the characteristics of the entire population. Sampling is conducted due to limitations of time, cost, or other factors that hinder research on the entire population (A. A. Hidayat, 2015).

In this study, the researcher used the Purposive Sampling technique, which involves selecting samples based on specific criteria predetermined by the researcher (Setiawati, Pranadani, & Ismail, 2024). Inclusion criteria for this study are: Patients with stage 2-3 wounds in the proliferation phase, wounds without active infection or serious complications, patients willing to participate in the study and provide informed consent, and patients who are cooperative and able to follow study instructions. Exclusion criteria for this study are: Patients with complicated wound conditions, patients with infection cases, and patients with stage 1 and 4 wounds. This research involves two main variables: the dependent variable and the independent variable. In this study, the dependent variable is the wound, while the independent variable is wound care using Hydrocolloid. In this study, the independent variable is wound care with Hydrocolloid, which is assumed to influence the wound healing process as the dependent variable. (Surjaatmadja, 2024). The independent variable in this study is the effectiveness of using Hydrocolloid, which is expected to affect the wound healing process as the dependent variable. The dependent variable is the variable that is influenced by or depends on the independent variable. This variable will change as a result of the independent variable's influence. observed or measured in research to determine the impact of changes in the independent variable on the research outcome (Surjaatmadja, 2024). The dependent variable in this study is the wound healing process.

RESULT AND DISCUSSION

Wound assessment was performed using the Winner scale, where a total score <25 indicates the wound is in the regeneration phase, while a score >25 indicates the wound is in the degeneration phase.

Table 1. Total Wound Measurement Values Before Hydrocolloid

Measurement	Mean	Median	Modus	Standar deviasi
Pre-Test	28,23	28,00	28	3,093

Application Based on the statistical test results for wound measurements before Hydrocolloid application in relation to the wound healing process, it is known that the average value (mean) is 28.23 and the standard deviation is 3.093. Those results indicate that the wound is undergoing degenerative changes.

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Table 2. Total Wound Measurement Values After Hydrocolloid Application

Measurement	Mean	Median	Modus	Standar deviasi
Post-Test	15,63	15,00	15	3,090

Based on the results of statistical tests on wound measurements after applying Hydrocolloid to the wound healing process, the average value (mean) was found to be 15.63 and the standard deviation was 3.090. These results indicate that the wound is undergoing regenerative healing.

Table 3. Normality Test

	Shapiro-wilk		
	Statistic	Df	Sig.
Result	0.945	30	0.124

Normality Test Table 3. Normality *Test Shapiro-Wilk* Statistic Df Sig. Result 0.945 30 0.124 a. Lilliefors Significance Correction The results of the normality test using the Shapiro-Wilk method show a value of 0.124 (p > 0.05), which means the data used are normally distributed or suitable for the type of data that can be calculated using certain statistical tests. Therefore, the analysis continued using the *Paired Sample t-Test.*

Differences in Wound Assessment Results Before and After Intervention.

Table 4. Results of the Difference Test for Wound Assessment Before and After Intervention

		Mean	**N**	**Standar deviasi**	**P-value**
Pair	*Pre-test*	28,00	30	3,093	0,000
	Post-test	15,63	30	3,090	

Based on the statistical test results using the Paired Simple t-Test, a difference was found in the wound healing process before and after the application of Hydrocolloid, with a P-value of 0.000 (p<0.001), indicating that H0 was rejected and Ha was accepted. This means that Hydrocolloid is effective in assisting the wound healing process in patients with wounds at the Hanifah Medika Center Primary Clinic.

The results of the comparison test of wound measurements before and after applying Hydrocolloid using the Paired Sample t-Test yielded a P-value of 0.000 (p<0.05), indicating a significant difference in Winner scale scores between before and after the intervention in wound patients at the Hanifah Medika Center Primary Clinic. Therefore, H0 is rejected and Ha is accepted, indicating that the use of Hydrocolloid has a positive effect on wound healing. The comparison of patients' wound conditions shows the respondents' status based on wound observation for 30 respondents. In the pre-test results, 30 respondents showed degenerative wound conditions with an average score of 28.23 ± 3.093, while in the post-test results, all respondents showed wound regeneration with an average score of 15.63 ± 3.090. Based on these findings, it can be concluded that patients at Hanifah Medika Center Primary Clinic experienced a healing process after being treated with Hydrocolloid.

This aligns with research conducted by Mufidah (2023), which examined the impact of applying Hydrocolloid dressing to treat wound maceration, where all respondents experienced wound regeneration with an average score of 21.85 ± 7.22. Each respondent also showed a decrease in BWAT scores with an average of 11.30 ± 6.12. Additionally, research by Novitasari (2024) showed statistical test results with a P-value of 0.005, indicating that the application of hydrocolloid dressing has an effect on wound maceration.

A wound is damage to the anatomical structure and continuity of tissue caused by injury or surgical procedures, often accompanied by exudate, pain, redness (erythema), and an unpleasant odor (Khotijah & Susilo, 2025). This condition reflects the wounds of patients experiencing chronic inflammation, infection, and the presence of necrotic tissue.

The wound healing process consists of several phases. The inflammatory phase lasts from the time of trauma until day 3,

during which capillary vessels and platelets work for hemostasis, while leukocytes and macrophages fight bacteria and clear wound debris. The proliferation phase occurs between days 3 and 21, characterized by collagen production by fibroblasts and angiogenesis forming new vascular tissue. The maturation phase, lasting from day 21 to 3 years, functions to increase the strength and elasticity of new skin after wound healing (Kusumah, 2025).

During the proliferation phase of wound healing, inflammation needs to be controlled and the re-epithelialization process begins for the wound to close. Cells like keratinocytes, fibroblasts, epithelial cells, and blood vessels move to the wound area to repair the tissue. Topical zinc application accelerates this process by increasing fibroblast migration and supporting angiogenesis. Fibroblasts begin to enter the wound area two to three days after the injury, producing collagen and extracellular matrix to fill the void. Collagen helps in the growth of skin cells and blood vessels for faster wound closure. Additionally, the TGF-B (Transforming Growth Factor Beta) protein regulates cell growth, particularly collagen production, and works thru protein transcription factors, which require zinc as a cofactor to support the formation of granulation tissue in the wound healing process (Aulia & Andrini, 2025).

The wound care method used in this study is the application of hydrocolloid dressings. These dressings serve to keep the wound moist, protect it from trauma, and prevent the risk of infection. Additionally, hydrocolloids can absorb minimal amounts of exudate and are used as primary or secondary dressings, also supporting the autolysis process to remove necrotic tissue or slough. Made from materials like gelatin, carboxymethylcellulose, and elastomers, this dressing is indicated for wounds with redness, epithelialization, and minimal exudate. However, this dressing is not recommended for use on infected wounds or grade III wounds. Hydrocolloids contain hydroactive (hydrophilic) particles bound to a hydrophobic polymer, where the hydrophilic particles absorb excess moisture from the wound and convert it into a gel. For application, the hydrocolloid sheet should be larger than the wound size, extending about 2.5 cm from the wound edge onto the healthy skin surrounding the wound (Indriyani, 2024).

The results of the study, which involved wound conditions both before and after the application of Hydrocolloid, were observed using the Winner scale sheet. All patients showed a decrease in their scores for each item. This is due to the wound care using modern dressing techniques and also various maximum efforts during the treatment process to achieve good healing.

Limitation

This study has several limitations and is not yet fully complete, namely: 1) In the study conducted on wound patients using Hydrocolloid, the researcher only obtained 30 respondents. This was due to the difficulty in finding patients with wound conditions that met the researcher's criteria. 2) Due to time constraints during the study, the researcher was unable to achieve optimal results for wound healing using Hydrocolloid. 3) Due to the speed of time during dressing changes, the researcher was unable to fully document the process from wound cleaning to applying the dressing.

CONCLUSION

Based on the findings of the study on "The Effectiveness of Hydrocolloid Use on Wound Healing in Patients at Hanifah Medika Center Primary Clinic," it can be concluded that Before the hydrocolloid dressing intervention, the average pre-test Winner scale score was 28.23 ± 3.093, indicating wound degeneration in the patients' wounds, After the hydrocolloid dressing intervention, the average post-test Winner scale score was 15.63 ± 3.090, indicating wound regeneration in the patients' wounds and there was a change in the Winner scale score before and after the hydrocolloid dressing intervention for patients with wounds, with a P-value of 0.000 ($p<0.05$), which means that the use of hydrocolloid is effective in reducing the Winner scale score in patients with wounds.

RECOMENDATION

Nurses are advised to improve their skills in using hydrocolloid, apply it optimally, and evaluate its effectiveness. Collaboration with the medical team and patient education are also important to accelerate wound healing and improve the quality of care and For patients who have received intervention with Hydrocolloid, and for families who understand the type of dressing appropriate for the wound suffered, it is hoped that the family can continue to provide support to the patient so that the patient can continue treatment until recovery.

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REFERENCES

Afandi, I. (2020). Studi Kasus Perawatan Luka Menggunakan Metode Modern Dressing Hydrocolloid Dalam Penyembuhan Luka Ulkus Diabetik (Gangren) Pada Pasien Dm Tipe Ii Di Perumahan Griya Utama Bangkalan. Universitas Muhammadiyah Surabaya.

Ahnaf, K. C., & Riyadi, N. H. (2024). Alat Pengukur Dimensi Luka Pada Kasus Forensik. Universitas Islam Indonesia.

Aji, M. (2024). Efektivitas Polyurethane Foam Sebagai Primary Dressing Terhadap Fase Proliferasi Proses Penyembuhan Luka Pada Pasien Venous Leg Ulcer Di Wocare. Universitas Nasional.

Aksara, P. T. B. (2021). Metodologi Penelitian Kuantitatif. Bumi Aksara. Retrieved From Https://Books.Google.Co.Id/Books?Id=Wy8feaaaqbaj

Amalia, A. N., & Arthur, R. (2023). Penyusunan Instrumen Penelitian: Konsep, Teknik, Uji Validitas, Uji Reliabilitas, Dan Contoh Instrumen Penelitian. Penerbit Nem. Retrieved From Https://Books.Google.Co.Id/Books?Id=Rx3jeaaaqbaj

Aminuddin, M., Sholichin, S. K., & Nopriyanto, D. (2020). Modul Perawatan Luka. Samarinda: Program Studi Diploma Iii Keperawatan Fakultas Kedokteran Universitas Mulawarman.

Angga Aditya Nugroho, G. S. A. (2022). Asuhan Keperawatan Pada Pasien Ulkus Diabetikum Dalam Pemenuhan Kebutuhan Keamanan Dan Proteksi : Integritas Kulit.

Arisdiani, T., & Arifin, N. (2024). Peran Perawat Dalam Perawatan Luka Pada Pasien Bedah Medikal: Strategi Dan Praktik Terbaik. Jurnal Ilmu Keperawatan Dan Kesehatan, 1(2), 24–28.

Atma, Y. P., Noor, W., & Dian, I. (2020). Efektifitas Ekstrak Batang Patah Tulang (Euphorbia Tirucalli L.) Terhadap Penyembuhan Luka Sayat Tikus Putih Jantan Galur Wistar. Universitas Wahid Hasyim.

Aulia, M. B., & Andrini, N. (2025). Efek Pemberian Zinc Oksida 13% Topikal Terhadap Penyembuhan Luka Sayat Pada Tikus Putih Galur Wistar (Rattus Norvegicus). Jurnal Pandu Husada, 6(1), 78–87.

Baiq Shofa Ilhami,. (2022). Psikologi Perkembangan : Teori Dan Stimulasi. Cv Jejak (Jejak Publisher). Retrieved From Https://Books.Google.Co.Id/Books?Id=Ep-Meaaaqbaj

Carolina, M., Priskila, E., Faruk, D. A., & Ramadewi, L. (2024). Analisis Faktor Yang Berhubungan Dengan Lama Penyembuhan Luka Gangren Diabetikum Pada Pasien Diabetes Melitus Di Ruang Cempaka Rsud Dr. Murjani Sampit: Analysis Of Factors Relating To The Duration Of Diabetic Ganggrene Wound Healing In Diabetes Mellitus P. Jurnal Surya Medika (Jsm), 10(2), 369–377.

Devita Sari, Deltari Novitasari, A. (2024). Pengaruh Hydrocolloid Dressing Terhadap Maserasi Luka Pasien Diabetes Melitus Di Klinik Praktik Perawat

Mandiri Griya Walima Kota Lubuklinggau. Injection: Nursing Journa, 4.

Dimantika, A., Sugiyarto, S., & Setyorini, Y. (2020). Perawatan Luka Diabetes Mellitus Menggunakan Teknik Modern Dressing. Interest: Jurnal Ilmu Kesehatan, 9(2), 160–172.

Dos Santos ; Andi Jusmiana ; Novitasari, Muhson, & Hapsan, A. (2024). Analisis Data Kuantitatif Dengan Program R. Cv. Ruang Tentor. Retrieved From Https://Books.Google.Co.Id/Books?Id=Tmmreqaaqbaj

Daniel Ardian Soeselo, & Theresia, S. (2021). Keterampilan Bedah Sederhana Di Fasilitas Layanan Primer. Penerbit Universitas Katolik Indonesia Atma Jaya. Retrieved From Https://Books.Google.Co.Id/Books?Id=Kskyeaaaqbaj

Dwi Riyani, D. (2024). Perawatan Luka Modern Dressing Terhadap Penyembuhan Ulkus Diabetes Melitus Di Rs Pku'aisyiyah Boyolali. Universitas Kusuma Husada Surakarta.

Erida, Y. (2021). Asuhan Keperawatan Pada Pasien Ulkus Diabetikum Dengan Masalah Kerusakan Integritas Jaringan Di Wilayah Kerja Puskesmas Paguyuban Tahun 2021. Universitas Muhammadiyah Pringsewu.

Ermalynda Sukmawati, A. C. B. M. (2023). Suhu Dan Lama Penyembuhan Luka Di Rumah Luka Surabaya. Malahayati Health Student Journal, 3, 2771.

Fathonah, S., Supatmi, S., Mufidah, N., Faridah, F., Suarningsih, Yanti, Juwita, R. (2023). Buku Ajar Keterampilan Dasar Keperawatan. Pt. Sonpedia Publishing Indonesia. Retrieved From Https://Books.Google.Co.Id/Books?Id=Bhlveaaaqbaj

Febri Arifin, S., & Achwandi, M. (2024). Analisis Asuhan Keperawatan Pada Pasien Diabetes Mellitus Dengan Masalah Keperawatan Gangguan Integritas Kulit Melalui Intervensi Perawatan Luka Dengan Teknik Moist Wound Healing Di Rsud Rt Notopuro Sidoarjo. Perpustakaan Universitas Bina Sehat Ppni.

Fiandri, D. C. (2020). Potensi Tanaman Patikan Kebo (Euphoria Hirta) Sebagai Penyembuh Luka. Jurnal Medika Hutama, 2(01 Oktober), 224–230.

Gulo, T. K. N. (2024). Hasil Penelitian Perbandingan Uji Efektivitas Madu Hutan Dan Gel Ekstrak Kulit Manggis Terhadap Penyembuhan Luka Bakar Grade Iia Pada Tikus Wistar Jantan.

Anang Setiana,. (2021). Riset Keperawatan : Lovrinz Publishing. Lovrinz Publishing. Retrieved From Https://Books.Google.Co.Id/Books?Id=Wnweeaaaqbaj

Harun, H., Haroen, H., Fitri, S. U. R., Herliani, Y. K., & Cahyadi, A. (2023). Edukasi Kesehatan Diet Tinggi Kalori Tingki Protein Pada Pasien Pasca Operasi Di Ruang Jasmin Rsu Sumedang. Jurnal Kreativitas Pengabdian Kepada Masyarakat, 6(2), 713–722.

Harun, H., Purba, C. I. H., Fitri, S. U. R., & Widayat, A. (2024). Peningkatan Pengetahuan Dan Kemandirian Keluarga Dalam Melakukan Perawatan Luka. Jurnal Kreativitas Pengabdian Kepada Masyarakat (Pkm), 7(3), 1351–1362. Https://Doi.Org/10.33024/Jkpm.V7i3.13551

Hasibuan, Z. E. (2024). Metodologi Penelitian Pendidikan. Ae Publishing. Retrieved From Https://Books.Google.Co.Id/Books?Id=Stiweqaaqbaj

Herdiyani, M., Safariyah, E., & Makiyah, A. (2024). Pengaruh Foot Exercise Terhadap Neuropati Motorik Pada Pasien Dm Tipe 2 Di Wilayah Kerja Puskesmas Benteng. Vitamin: Jurnal Ilmu Kesehatan Umum, 2(2), 54–71.

Hermy B. Hina, Darwin Damanik, Emilia Khristina Kiha, Muktar Redy Susila, Luluk Kholisoh, Dendi Zainuddin Hamidi, I Putu Suiraoka, (2024). Statistika Ii. Cendikia Mulia Mandiri. Retrieved From Https://Books.Google.Co.Id/Books?Id=Liofeqaaqbaj

Herry Setiawan, Prita Adisty Handayani., Arnianti, Yuanita Panma, Abdul Rokhman., Siti Sholikhah, Virgianti Nur Faridah. (2023). Keperawatan Dasar. Rizmedia Pustaka Indonesia. Retrieved From

Https://Books.Google.Co.Id/Books?Id=Ywi4eaaaqbaj

Hidayat, A. A. (2015). Metode Penelitian Kesehatan Paradigma Kuantitatif. Health Books Publishing. Retrieved From Https://Books.Google.Co.Id/Books?Id=Voateaaaqbaj

Hidayat Putra, M. A., & Soemah, E. N. (2024). Analisis Intervensi Perawatan Luka Dengan Metode Modern Dressing Pada Pasien Penderita Diabetes Melitus. Universitas Bina Sehat Ppni.

Hidayat, R., Naziyah, N., & Mufidah, Z. (2023). Pengaruh Hydrocolloid Dressing Untuk Mengatasi Maserasi Luka. Malahayati Nursing Journal, 5(10), 3429– 3439.

Hidayat, S., Miladiyah, N., & Ponirah, P. (2021). Literature Review Efektivitas Modern Dressing Hydrocolloid Terhadap Penyembuhan Luka Pada Pasien Diabetes Mellitus. Jkm: Jurnal Keperawatan Merdeka, 1(1), 81–92.

Huda, A., Sabil, T. M., & Maulina, P. (2024). Pengaruh Balutan Hydrocolloid Terhadap Penyembuhan Luka Diabetes Melitus Di Klinik Alhuda Wound Care: Pengaruh Balutan Hydrocolloid Terhadap Penyembuhan Luka Diabetes Melitus Di Klinik Alhuda Wound Care. Jurnal Kesehatan Akimal, 3(2), 70– 76.

Imayani, S., Safitri, A., & Warni, W. (2024). Manfaat Modern Dressing Hidrocolloid Terhadap Peningkatan Integritas Kulit Pada Anak Usia Sekolah Dengan Furunkel. Jurnal Kesehatan, Teknologi, Dan Sains, 3(1), 18–25.

Indriyani, S. A. (2024). Analisis Asuhan Keperawatan Melalui Intervensi Pemberian Hydrocolloid Terhadap Pencegahan Maserasi Luka Padatn. D Dan Tn. R Dengan Diabetic Foot Ulcer Di Wocare Center Kota Bogor. Universitas Nasional.

Karsiyu, K., Khusniyati, E., & Yulianti, I. (2024). Hubungan Mobilisasi Dini Dengan Penyembuhan Luka Post Sectio Caesarea (Sc) Di Rsud Sumberglagah Mojokerto. Perpustakaan Universitas Bina Sehat Ppni.

Kartika, I. (2024). Efektivitas Pemberian Gel Ekstrak Daun Kelor (Moringa Oliefera) Terhadap Kepadatan Kolagen Pada Proses Penyembuhan Luka Pasca Insisi Pada Mencit (Mus Musculus). Universitas Mahasaraswati Denpasar.

Khotijah, S., & Susilo, T. (2025). Pengelolaan Gangguan Integritas Kulit Dan Jaringan Pada Pasien Ulkus Diabetikum Dengan Perawatan Luka Modern (Studi Kasus). Jurnal Keperawatan Berbudaya Sehat, 3(1), 13–19.

Kinanti, T. P., & Suciliyana, Y. (2024). Percepatan Penyembuhan Luka Sectio Caesarea Dengan Pemberian Ikan Gabus Pada Ibu Y Dengan Post Sectio Caesarea Di Wilayah Purbalingga. Sentani Nursing Journal, 7(1), 36–41.

Kurniasih, J. (2024). Analisis Asuhan Keperawatan Intervensi Penggunaan Island Dressing Sebagai Balutan Primer Pada Pasien Tn. J Dan Ny. J Dengan Diagnosa Medis Post Appendictomi Di Rs Ukrida Jakarta Barat. Universitas Nasional.

Kusumah, W. W. (2025). Systematic Literature Review: Efektifitas Perawatan Luka Konsep Lembab Pada Perawatan Luka Diabetes: Systematic Literature Review: Efektifitas Perawatan Luka Konsep Lembab Pada Perawatan Luka Diabetes. Seroja Husada: Jurnal Kesehatan Masyarakat, 2(2), 669–680.

Laili, N. (2024). Diabetes Self Management Dengan Kemampuan Self Wound Care Pada Pasien Dengan Luka Gangren Di Klinik Pandawa Kediri. Jurnal Keperawatan Suaka Insan (Jksi), 9(1), 12–21.

Lestari Br Perangin Angin, E. (2024). Isolasi Dan Uji Aktivitas Antiinflamasi Senyawa Bioaktif Fraksi Etanol Biji Dungun (Heritiera Littoralis) Terhadap Mencit Putih Jantan (Mus Musculus). Kimia.

Mufidah, Z. (2023). Pengaruh Hydrocolloid Dressing Untuk Mengatasi Maserasi Luka Di Klinik Wocare Center Bogor. Universitas Nasional.

Murtiyani, N., Siswantoro, E., & Kushayati, N. (2024). Edukasi Wound Healing Dalam Peningkatan Pengetahuan Siswa Dalam Penanganan Luka Sederhana. Media Abdimas Indonesia, 2(2), 40–45.

Niken Safitri Dyan Kusumaningrum, Akhmad Ismail, A. B. P. (2021). Home-Based Wound Care Dan Layanan Online Diponegoro Wound Care: Solusi Penyembuhan Luka Untuk Pasien Di Masa Pandemi Covid-19. Jurnal Pengabdian Pada Masyarakat, 6, 325. Https://Doi.Org/10.30653/002.202161.699

Noer, S., Perdanakusuma, Saputro, Budi, Rizaliyana, S., Hutagalung, M. R., ... Putri, I. L. (2023). Pengetahuan Dan Keterampilan Dasar Ilmu Bedah Plastik Edisi Revisi. Airlangga University Press. Retrieved From Https://Books.Google.Co.Id/Books?Id=Gznfeaaaqbaj

Norfai,. (2022). Analisis Data Penelitian (Analisis Univariat, Bivariat Dan Multivariat). Penerbit Qiara Media. Retrieved From Https://Books.Google.Co.Id/Books?Id=Iy5-Eaaaqbaj

Ni Luh Putu Shinta Devi, Gusti Ayu Ary Antari, Zainal Abidin, Margareta Pratiwi, Luh Mira Puspita, Tobi Pitora, Made Oka Ari Kamayani,. (2023). Menggali Esensi Luka: Pengenalan, Penilaian, Dan Penanganan Yang Tepat. Kaizen Media Publishing. Retrieved From Https://Books.Google.Co.Id/Books?Id=7btleaaaqbaj

Yance Komela Sari, & Nopan Saputra,. (2024). Perawatan Luka. Azzia Karya Bersama. Retrieved From Https://Books.Google.Co.Id/Books?Id=8rkgeqaaqbaj

Nusdin,. (2022). Kenali Ulkus Diabetik, Penyebab Dan Manajemen Penatalaksanaannya. Rizmedia Pustaka Indonesia. Retrieved From Https://Books.Google.Co.Id/Books?Id=Zlcqeaaaqbaj

Oktaviani, A. T., Kusumajaya, H., & Agustiani, S. (2023). Faktor-Faktor Yang Mempengaruhi Penyembuhan Luka Post Operasi. Jurnal Penelitian Perawat Profesional, 5(4), 1703–1712.

Parasmita, R. (2024). Formulasi Sediaan Patch Transdermal Dari Resin Jernang (Daemonorops Draco (Wild.)) Dengan Kombinasi Polimer Pvp Dan Etil Selulosa Untuk Penyembuhan Luka Sayat Pada Tikus Putih Jantan (Rattus Norvegicus). Universitas Jambi.

Perdanakusuma, D. S. (2015). Modern Wound Management : Indication & Application: Pengetahuan Praktis, Informasi Produk Dan Direktori. Bedah Plastik Rekonstruksi Dan Estetik. Retrieved From Https://Books.Google.Co.Id/Books?Id=F9wfdwaaqbaj

Potter, P. A., Perry, A. G., Stockert, P. A., Hall, A., Novieastari, E., Ibrahim, K., & Deswani, D. (2019). Fundamentals Of Nursing Vol 2- 9th Indonesian Edition: Fundamentals Of Nursing Vol 2- 9th Indonesian Edition. Elsevier (Singapore) Pte Limited. Retrieved From Https://Books.Google.Co.Id/Books?Id=Vez3dwaaqbaj

Priyambodo, D. Y., Yumna, Artanti, & Widagdo, H. (2024). Karakteristik Luka Pada Pengendara Motor Korban Meninggal Akibat Kecelakaan Lalu Lintas Yang Terpapar Alkohol Di Yogyakarta Tahun 2015-2019. Jurnal Kedokteran Universitas Palangka Raya, 12(1).

Puspitasari, Z. (2022). Aplikasimodern Dressing Hydrocolloidterhadap Penyembuhan Luka Pada Pasien Diabetes Mellitus. Skripsi, Universitas Muhammadiyah Magelang.

Putri Wahyuningtyas, P. W. (2024). Implementasi Perawatan Luka Pada An. T Dengan Masalah Keperawatan Risiko Infeksi Pada Pasien Post Tenotomy Ed Causa Osteomyelitis Di Ruang Al-A'raaf Rsi Fatimah Cilacap. Universitas Al- Irsyad Cilacap.

Rasmita, D., Lestari, N. E., Noprida, D., Kd, N. A., Khodijah, K., Argarini, D., ... Daryaswanti, P. I. (2024). Tindakan Keperawatan Pada Anak Dengan Sakit Kronis. Pt. Sonpedia Publishing Indonesia. Retrieved From Https://Books.Google.Co.Id/Books?Id=Lscdeqaaqbaj

Risky Tiara Putri, R. (2024). Pengaruh Penerapan Modern Dressing Terhadap Perawatan Luka Infeksi Pada Pasien Post Operasi. Universitas Kusuma Husada Surakarta.

Ritonga, Y. S., Naibaho, E. N. V, Silaban, N. Y., Gultom, S. H., Manurung, R., Ruhyanudin, F., ... Siburian, C. H. (2024). Kasus Terapi Fisik : Perawatan Akut. Azzia Karya Bersama. Retrieved From Https://Books.Google.Co.Id/Books?Id=4nwoeqaaqbaj

Roesminingsih, M. V, Widyaswari, M., Rosyanafi, R. J., & Zakariyah, F. (2024). Metodologi Penelitian Kuantitatif. Bayfa Cendekia Indonesia. Retrieved From Https://Books.Google.Co.Id/Books?Id=Upfveaaaqbaj

Roflin, E. (2022). Metode Penelitian Kesehatan. Penerbit Nem. Retrieved From Https://Books.Google.Co.Id/Books?Id=6p9feaaaqbaj

Roflin, E., & Liberty, I. A. (2021). Populasi, Sampel, Variabel Dalam Penelitian Kedokteran. Penerbit Nem. Retrieved From Https://Books.Google.Co.Id/Books?Id=Isyreaaaqbaj

Roflin, E., Zulvia, F. E., & Liberty, I. A. (2021). Pengolahan Dan Penyajian Data Penelitian Bidang Kedokteran. Penerbit Nem. Retrieved From Https://Books.Google.Co.Id/Books?Id=_5yweaaaqbaj

Sa'diyah, H., Rahmawati, W. K., & Ulwiyah, I. (2024). Efektivitas Teknik Role Playing Untuk Mereduksi Perilaku Taunting (Ejekan) Siswa Kelas Viii B Smpn 1 Sukorambi Jember. Journal Scientific Of Mandalika (Jsm) E-Issn2745-5955| P-Issn 2809-0543, 5(10), 443–449.

Safitri, A., Harahap, Y. N., & Bako, S. (2024). Efektivitas Autolytic Debridement Menggunakan Madu Terhadap Penunurunan Jaringan Nekrrotik Pada Pasien Luka Kronik. Jurnal Kesehatan, Teknologi, Dan Sains, 3(1), 10–17.

Saputra, Rahmi, Fadillah, S., Habibi, H., Fazarudin, F., Susanti, F., ... Utama, S. D. (2024). Asuhan Keperawatan Pada Pasien Dengan Luka. Cv. Gita Lentera. Retrieved From Https://Books.Google.Co.Id/Books?Id=H84beqaaqbaj

Sari, I. W. W., & Nurafriani, F. (2024). Status Nutrisi Pasien Kanker Yang Menjalani Kemoterapi Di Yogyakarta. Jurnal Keperawatan, 16(2), 661–670.

Selomo, P. A. M., Darmayanti, D., & Ridwan, U. N. (2024). Teknik Perawatan Luka. Pekan: Jurnal Pengabdian Kesehatan, 3(1), 1–4.

Setiawati, R., Pranadani, A., & Ismail, A. (2024). Metodologi Penelitian Bisnis: Strategi Dan Teknik Penelitian Terkini. Asadel Liamsindo Teknologi. Retrieved From Https://Books.Google.Co.Id/Books?Id=Okdyeaaaqbaj

Simatupang, R., Simatupang, M., & Hidayat, M. (N.D.). Buku Ajar Home Care Ulkus Diabetikum. Penerbit P4i. Retrieved From Https://Books.Google.Co.Id/Books?Id=Nwljeaaaqbaj

Sukmawati, E., & Mare, A. C. B. (2023). Suhu Dan Lama Penyembuhan Luka Di Rumah Luka Surabaya. Mahesa: Malahayati Health Student Journal, 3(9), 2768–2773.

Sukurni, S. (2023). Perawatan Luka Dengan Modern Dressing.

Surjaatmadja, S. (2024). Metodologi Penelitian Untuk Kualitas Riset Terbaik. Zahen Publisher. Retrieved From Https://Books.Google.Co.Id/Books?Id=Khsfeqaaqbaj

Suryawan, I. G. R., Ardiana, M., & Pikir, B. S. (2024). Buku Ajar Ilmu Kardiovaskular Berbasis Standar Nasional Pendidikan Profesi Dokter Jilid 1. Airlangga University Press. Retrieved From Https://Books.Google.Co.Id/Books?Id=N_T8eaaaqbaj

Suthaningrat, (2023). Efektivitas Salep Ekstrak Rimpang Bangle (Zingiber Purpureum Roxb) Terhadap Kepadatan Kolagen Pada Proses Penyembuhan Luka Pencabutan Gigi Marmut (Cavia Cobaya). Universitas Mahasaraswati Denpasar.

Thalib, A. H. S., & Ningsih, L. W. (2021). Efektifitas Perawatan Luka Decubitus Dengan Metode Modern Dressing Terhadap Proses Penyembuhan

Luka: Literatur Review. Jurnal Mitrasehat, 11(1), 37–44.

Umar, I., & Sujud, R. W. (2020). Hemostasis Dan Disseminated Intravascular Coagulation (Dic). Journal Of Anaesthesia and Pain, 1(2), 19–32.

Wahyuni, S., Syaiful, S., & Husnaeni, H. (2023). Hubungan Usia Dan Jenis Kelamin Terhadap Derajat Luka Kaki Diabetik Pada Penderita Dm Di Kota Makassar. Healthy Tadulako Journal (Jurnal Kesehatan Tadulako), 9(2), 194–198.

Wijaya (2018). Perawatan Luka Dengan Pendekatan Multidisiplin. Penerbit Andi.

Wisnasari, S., Utami, Y. W., Susanto, A. H., & Dewi, E. S. (2021). Keperawatan Dasar: Dasar-Dasar Untuk Praktik Keperawatan Profesional. Universitas Brawijaya Press. Retrieved From Https://Books.Google.Co.Id/Books?Id=Fozteaaaqbaj

Wulandari, T. S., & Kurniawati, R. (2023). Gambaran Kualitas Hidup Pasien Dengan Luka Kronik Yang Melakukan Perawatan Luka Di Klinik Luka. Jurnal Ilmiah Keperawatan Dan Kesehatan Alkautsar (Jikka), 2(1), 1–8.

Zonia, R., & Gusti, D. R. (2023). Uji Efektivitas Fraksi Rimpang Jahe Merah (Zingiber Officinale Var. Rubrum) Terhadap Penyembuhan Luka Sayat Pada Tikus Putih Jantan. Universitas Jambi.