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The Clinical Profile of Patients with Chronic Wounds at Dr. Soetomo General Hospital 2015-2020

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ABSTRACT

Background: Wounds that have lasted a long time due to failure to continue the normal healing process can be called chronic wounds. Chronic wounds occur due to multiple factors. There are problems that are often found in chronic wounds, such as the presence of exudate, necrotic tissue, and bacteria. The incidence of chronic wounds is closely related to the high cost of treatment and impaired quality of life. Prompt wound management is needed to optimize wound healing. **Purpose:** To determine the profile of chronic wounds in patients treated by the Department of Plastic Surgery Dr. Soetomo General Hospital Surabaya from 2015 – 2020. **Methods:** The data were obtained from patients medical records through total sampling technique, which consist of age, gender, past medical history, clinical features, diagnosis, management, and outcome. **Result:** This study involved 53 patients, dominated by male patients (70%) aged 46-65 years old (34%). The patient's history showed that most patients suffered from type 2 diabetes (22%). The problem that often occurs is the presence of exudate which is mostly diagnosed with pressure ulcers (40%). All patient get wound bed preparation and the patient's outcome was dominated by recovery (72%). **Conclusion:** There are several factors affecting wound healing and prompt wound management are important to improving the outcomes.

Keywords: chronic wound, clinical appearance, comorbidities, wound management.

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BACKGROUND

Injuries are something that cannot be avoided and are closely related to human life. Any tissue damage due to disruption of the normal anatomical structure and function of the tissue can be referred as a wound.[1] Based on the time of wound healing, wounds are divided into two, acute wounds and chronic wounds. Acute wounds are wounds with healing progress by the normal concept of wound healing or wounds that can be determined by the length of healing. Chronic wounds are wounds that have lasted a long time because they fail to continue the normal healing process or wounds that recur frequently so that the healing time cannot be determined.[2] Based on the etiology, the common chronic wounds found are pressure sores, diabetic ulcers, varicose ulcers, and arterial ulcers.[3]

Several factors can inhibit wound healing such as weak immune system, venous insufficiency, obesity, comorbidities, etc. The problems that exist inchronic wound are necrotic tissue, bacterial/infection, and presence of exudate.[4] The incidence of chronic wounds is a serious health problem. Chronic wound always related to the high cost of treatment, high mortality,

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and morbidity.

In August 2006 to August 2007 found as many as 306 cases of chronic wound covering 0,69% of all patients hospitalized at Dr. Soetomo General Hospital, Surabaya.[5]

The Clinical profile of patients with chronic wound at Dr. Soetomo General Hospital in 2015-2020 has not been studied and analyzed so this research is carried out to be used as management strategy for chronic wound care and is expected to be used as additional data to help reduce the incidence of chronic wounds especially in Dr. Soetomo General Hospital, Surabaya. From the explanation above that chronic wound are always related to high cost and affecting the quality of life, this study is expected to provide an overview of chronic wound of the patient that are treated by the Plastic Surgery Departement on Dr. Soetomo General Hospital from 2015-2020.

METHODS

This study aims to describe the profile of patients with chronic wound that are treated by the Plastic Reconstructive and Aesthetic Surgery Departement on Dr. Soetomo General Hospital from 2015-2020. This type of research is a descriptive retrospective using the patients medical records. The inclusion criteria was the patients with complete medical records data including age, gender, past medical history, clinical features, diagnosis, management, and the outcome. The research was conducted at the Rekam Medik Pusat and ICT Dr. Soetomo General Hospital from July 2021 to February 2022. The data were processed using Microsoft Excel, through editing, coding, entry data, and cleaning. The data obtained is then analyzed using descriptive statistics method. The results of this study will be presented in the frm of description, tables, and graphs. This study had been approved by the Health Research Ethics Committee of Dr. Soetomo General Hospital Surabaya with the ethics number 0657/LOE/301.4.2/X/2021.

RESULT

This study samples were 53 patient with chronic wound that has been treated by Plastic Surgery Department of Dr. Soetomo General Hospital, Surabaya from 2015-2020. Most patient were 46-65 years old (34%) (Table 1).

Table 1. Age distribution of patients with chronic wounds in Dr. Soetomo General Hospital, Surabaya in 2015 – 2020

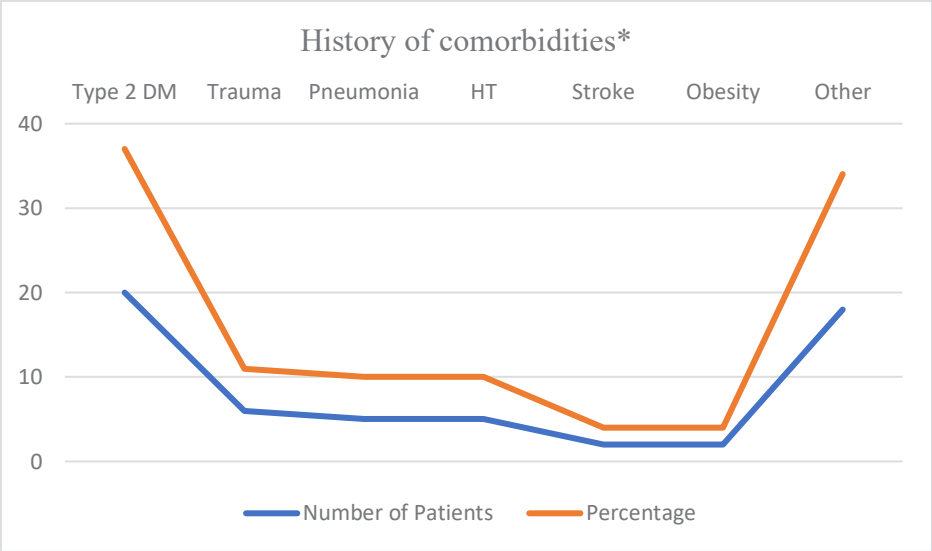
Age	Number of Patients	Percentage (%)
Toddler (0-5 years)	4	7
Children (6-11 years)	1	2
Early teens (12-16 years)	2	4
Late adolescence (17-25 years)	3	6
Early adulthood (26-35 years)	8	15
Late adulthood (36-45 years)	6	11
Early elderly (46-55 years)	18	34
Late elderly (56-65 years)	8	15
Seniors (>65 years)	3	6

From Table 1, it is found that the distribution of patients with chronic wounds who are treated at RSUD Dr. Soetomo Surabaya varies at every age. The age classification in this study is based on the Indonesian Ministry of Health, 2009. The number percentage is quite high in the elderly group of patients aged 46 years and over. The largest number was found in early elderly patients (34%). The youngest patient was 1 years old and the oldest patient was 83 years old.

From Table 2, it shows that patients with chronic wounds that was treated at Dr. Soetomo General Hospital, Surabaya from 2015-2020 was dominated by men (70%). The percentage of female patients with chronic wound only 30%.

Table 2. Sex distribution of patients with chronic wounds in Dr. Soetomo General Hospital, Surabaya in 2015 – 2020

Gender	Number of Patients	Percentage (%)
Man	37	70
Woman	16	30
Total	53	100



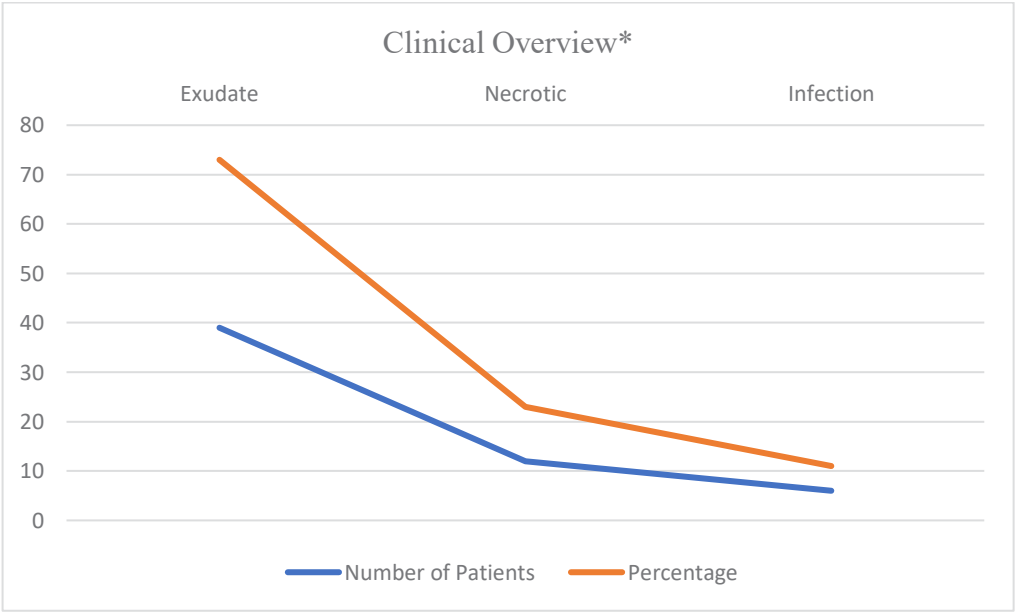
* : one patient has a history of more than one disease

Figure 1. Distribution of patient history before the onset of chronic wounds in patients with chronic wounds at Dr. Soetomo General Hospital, Surabaya from 2015 – 2020.

History taking finding consist of past medical history. The most common previous disease in patient with chronic wounds were patients with type 2 diabetes mellitus. There are 20 patients with type 2 diabetes mellitus (34%), followed by 6 patients with trauma (11%), and 5 patients with pneumonia (10%) (Figure 1).

Chronic microvascular complication from patient with type 2 diabetes mellitus are peripheral neurophaty. People with neuropathy tend to not feel pain when they had wound.[10] Patient with poor lifestyle, those who rarely use footwear prone to develop wound because they didn't aware of it. Meanwhile patient that are admitted to RSUD Dr. Soetomo from 2015-2020 suffer from pneumonia, 5 of them were immobile. Decrease mobility making structural change difficult and this thing could lead to a pressure sores or so called decubitus ulcer.[17]

Clinical features in the form of problems that can be found in the wounds of chronic wound patients are vary. This problem can be found in single and mixed (Figure 2).



* : some patients have more than one problem

Figure 2. Distribution of clinical features of the patients with chronic wounds in Dr. Hospital. Soetomo 2015 – 2020

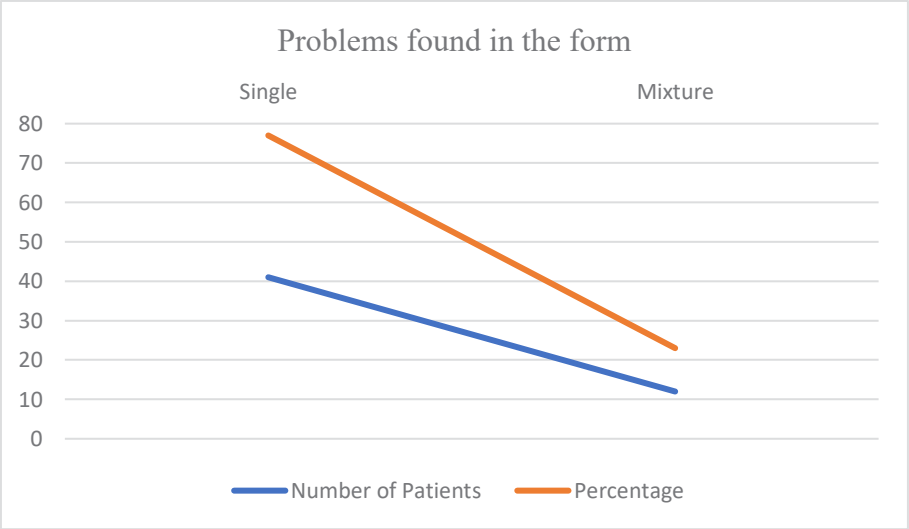


Figure 3. Distribution of problems founf in the form of problems found in the wounds of patients with chronic wounds in Dr. Hospital. Soetomo 2015 – 2020

Based on Figure 2, the clinical features of patients with chronic wound in Dr. Soetomo General Hospital in 2015-2020, the most common problem found was the presence of exudate in the patients wound (73%). There are 39 patient have exudate on their wounds (73%), 12 patients have necrotic tissue (23%), and 6 patient have an infection (11%). This problem can occur singly or in combination. Patients condition also affecting the wounds clinical overview. The poorer the condition the poorer the problems found. But most of the patient with chronic wound that are admitted most likely have exudate on it.

As much as 41 patients with chronic wound have single form of problem (77%) wether it's the presence of exudate, infection, or presence of necrotic tissue.

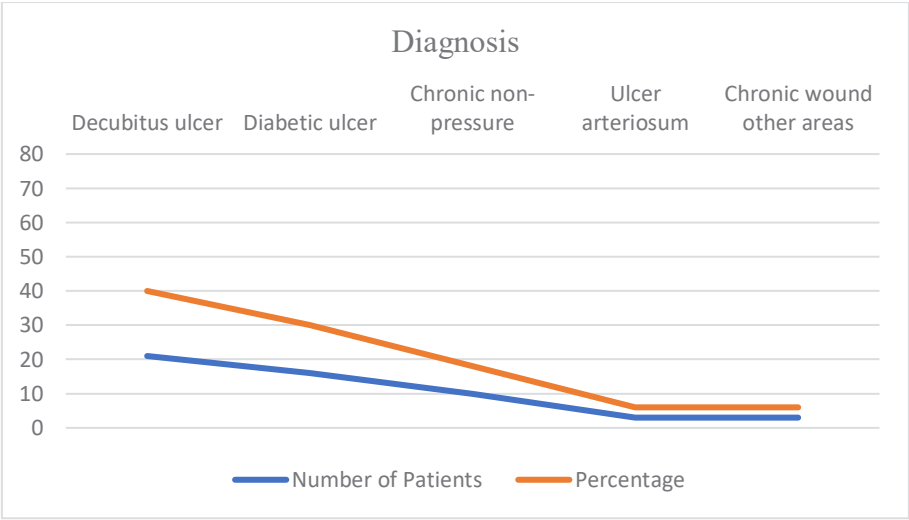
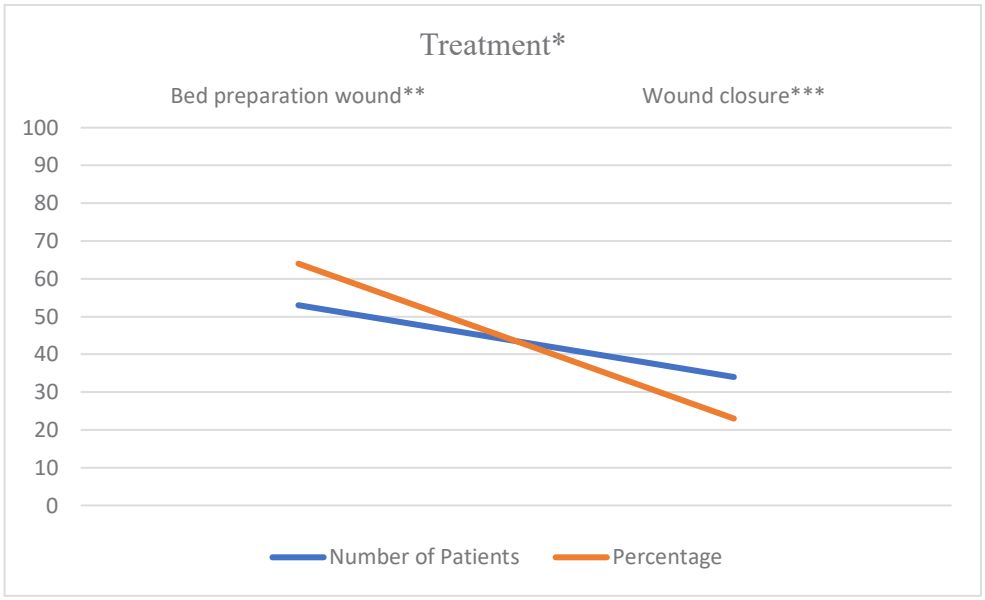


Figure 4. Distribution of diagnoses in patients with chronic wounds in Dr. Soetomo General Hospital, Surabaya in 2015 – 2020.

Based on Figure 4, the diagnosis of the patients with chronic wounds at Dr. Soetomo Hospital in 2015-2020 is dominated with pressure ulcers or decubitus ulcers (40%). In addition to pressure ulcers, there are patients with a diagnosis of diabetic ulcer (30%). Based on the medical report, some of the patient with pressure sores also has type 2 diabetes mellitus but they develop pressure sores not diabetic foot ulcer.

The wound management in Dr. Soetomo General Hospital, Surabaya consists of wound bed preparation. All 53 patients with chronic wound that are treated in Dr. Soetomo General Hospital, Surabaya in 2015-2020 received wound bed preparation (Figure 5).



* : performed more than one therapy in one patient
** : consists of clinical examination, *debridement* , control of the presence of exudate, and control of bacteria
*** : consists of *flap* and *skin graft*

Figure 5. Distribution of treatment in patients with chronic wounds in RSUD Dr. Soetomo 2015 – 2020.

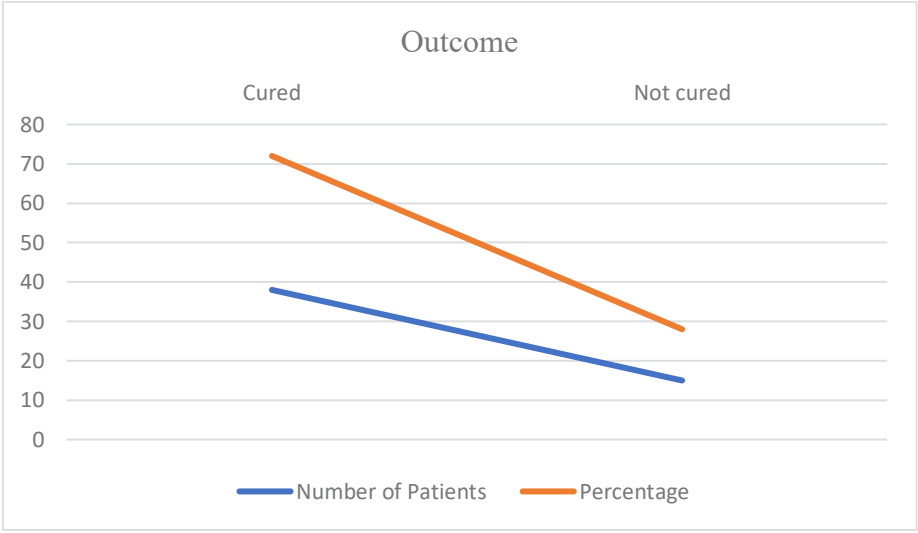


Figure 6. *Outcome* distribution of chronic wound patients in Dr. Soetomo General Hospital, Surabaya in 2015– 2020

As much as 53 patients received wound bed preparation (100%) by doing debridement, controlling the presence of exudate, and controlling the bacteria to reduce the risk of infection. All patients received wound bed preparation but only 34 patients received wound closure therapy in the form of flap or skin graft (64%) (Figure 5).

Not all patient receive wound closure, this depend on patient wound condition and patient history of comorbidities. Well prepared wound can receive wound closure therapy. But not all patient needs wound closure therapy, some of the patient wound healed persekundam or healed on it's own (epithelialization) after receiving a wound bed preparation.

Patient with bad wound condition and wound that are unresponsive to medication most likely didn't receive a wound closure. There are 19 other patients who didn't received wound closure such as: flap or skin graft (36%), 12 of them were declared cured and 7 of them were declared not cured.

Prompt management of chronic wound are important factor to determine the outcomes of the patient.

Based on Figure 6, it was found that the majority of patients were discharged from the hospital recovering. A total of 72% of patient outcomes were cured and 28% of patient outcomes were not cured. Patients outcome rely on some factors such as: age, gender, history of comorbidities, type of wound, wound condition, and the wound respons to medication. There are 38 patients that are admitted to RSUD Dr. Soetomo General Academic Hospital from 2015-2020 that suffer from chronic wound but their wound were cured. 15 patient with chronic wound that aren't cured, 7 of them were dead, the rest of them changing status to outpatient care and forced discharge.

DISCUSSION

Based on this study, patients with chronic wound is widespread at all ages. Patients with chronic wounds who were treated at Dr. Soetomo General Academic Hospitall in 2015 - 2020 were mostly found in the elderly, namely 46 years of age or older. Older people tend to have weaker immunity system. In addition to decreased immunity, degenerative diseases, decreased organ function, and changes in physiological function are very common on older people.[6] Changes experienced by the elderly patients will affect the wound healing process, this condition makes elderly patients prone to chronic wounds.

Similar study about chronic wound conducted at Zainal Abidin General Hospital and Meuraxa General Hospital, Banda Aceh, have similarities with this study, patients with diabetic ulcers were dominated by elderly age group ranging from 45-65 years.[7]

In 2015 – 2020 at Dr. Soetomo General Hospital, Surabaya, it was found that patients with chronic wounds were dominated by male, with a ratio of 70% male patients and 30% female. Elderly men aged 46 years or more dominate the number of patients with chronic wounds in Dr. Soetomo General Hospital, Surabaya in 2015 – 2020. Men's skin tends to be thicker in collagen than women's skin, but women's skin has thicker subcutaneous tissue than men's.[8] The wound healing process is also influenced by several factors, in addition to the structure of the skin, there are sexual hormones that are also associated with the onset of chronic wounds. Women have the hormone estrogen, and many molecular and clinical studies have shown that estrogen has an effect on normal skin homeostasis and wound healing.[8] In elderly women, it is often associated with the incidence of menopause in which estrogen levels decrease. This decrease in the hormone estrogen will affect the wound healing process, so elderly women are susceptible to chronic wounds. The same thing with men, as you get older there will be a decrease in testosterone levels. This decrease in testosterone can be a risk factor for diseases such as diabetes mellitus, hypertension, and increased visceral fat deposition.[9] In addition, lifestyle also plays a major role in the emergence of chronic wounds where most men tend to treat their feet less often, causing them to have lower leg injuries that will be left untreated. However, gender will not affect if there is interference from the age factor and the patient's medical condition.

In this study, various diseases were recorded from 53 patient samples. The patient's previous medical history are very diverse where one patient can have several medical histories. So it is common for chronic wounds patients to be caused by multiple factors. Based on the data obtained by researchers from medical records, there are three medical histories that most patients suffered before the patient suffered from chronic wounds, namely type 2 diabetes mellitus, pneumonia, and hypertension.

Past medical history dominating this research is type 2 diabetes mellitus. Diabetes mellitus is a metabolic disorder characterized by impaired insulin production or function that can cause hyperglycemia.[10] The wound healing process generally involves many types of cells, cytokines, mediators, and a good circulatory system. Disruption of the wound healing process in people with diabetes mellitus is complex because it involves vascular, neuropathic, immune, and biochemical components. People with diabetes have blood vessels that tend to be more rigid, this can cause circulation in the body to be slower, causing reduced tissue oxygenation and more susceptibility to infection.[11] Uncontrolled diabetes can cause high blood sugar levels in the body that can lead to damage of the blood vessels or known as peripheral neuropathy.

Heart plays an important role in aspects of a person's health. The heart play a major role to circulate blood rich in oxygen and nutrients throughout the body. Hypertension or often referred to as high blood pressure is a condition in which blood vessels continuously increasing pressure.[12] This pressure is created by the blood pushing against the artery walls as it is pumped by the heart, so the higher the pressure the harder the heart has to pump. In the hypertensive population the clotting process and coagulation cascade are disrupted, so hypertension is also often complicated for the normal wound healing process. Damaged blood vessels are a common component of cardiovascular disease, which can lead to sluggish blood flow that impedes the delivery of oxygen and nutrients needed to heal wounds.[13] Most people with hypertension have high triglycerides and decreased HDL.[14] HDL is able to increase the number of

endothelial progenitor cells (EPC). HDL can affect the healing process by accelerating the inflammatory process by increasing the formation of granulation tissue involving increased EPC and re-epithelialization. Therefore, people with decreased HDL levels will find it more difficult to carry out the normal healing process, making them susceptible to chronic wound.[14]

Based on the results of this reasearch, it was found that there were problems with chronic wounds of patients treated at Dr. Soetomo General Hospital 2015-2020. There are three main problems faced, presence of dead/necrotic tissue, the presence of exudate, and the presence of bacteria. These three problems arise either singly or in combination. In this study, it was found that 39 patients with chronic wounds had exudate problems, 12 patients had necrotic problems, and 6 patients had infections.

Wound exudate is a normal part of the wound healing process to prevent the wound bed from drying out. The presence of fluid in the wound bed aims to help the tissue repair and provide cell transport and provide essential nutrients to aid wound healing.[4] Over time, the exudate present in the wound will decrease along with a normal healing process.[4] However, in chronic wounds, the presence of exudate will prolong the inflammatory phase and hinder the healing process. By regulating the production of fluid in the wound, the detrimental effect of exudate on the wound can be minimized.[4] If the wound has excess exudate and is not treated properly, maceration (skin blisters) can occur, making the skin more susceptible to damage.

In addition to exudate, there is necrotic tissue. The presence of necrotic or nonvital tissue is also a problem that is often found in patients with chronic wounds. Necrotic tissue itself arises due to a lack of blood supply, but it can be caused by excessive inflammation, ischemia, infection, and other factors.[4] Improper management of chronic wounds can also be a trigger for necrotic lesions. To facilitate the wound healing process, necrotic or non-vital tissue must be removed. Necrotic is often found in the form of slough and eschar.[15] Slough is a moist tissue that contains tissue and non-living bacteria, while eschar is a dry black tissue with a rough texture.[15] Eschar and slough must be removed to optimize the wound healing process because slough and eschar are not part of the wound healing process.[4] There were 36 patients with chronic wounds who were treated at Dr. Soetomo in 2015-2020 who have a slough.

The presence of bacteria in chronic wounds is also a problem that must be addressed. The colonization or replication of microorganisms in wounds can cause damage to wound tissue to prolong the wound healing process.[4] The presence of bacterial colonization that is not treated immediately can lead to infection. This not only inhibits wound healing but can interfere with the work of the patient's immune system. This infection can be local or systemic.

Chronic wounds are wounds that have lasted a long time due to the failure of the normal wound healing process or wounds that often recur. The wound healing process that fails to occur normally is also influenced by internal and external factors from the patient. The diagnosis of chronic wounds is divided into four, namely pressure ulcers/decubitus ulcers, diabetic ulcers, leg ulcers/varicose ulcers, and arteries ulcers.[3] Diagnosis of chronic wounds experienced by patients can be seen from the history of the disease and the patient's risk factors.

The results of data collection that have been carried out show that 40% of patients treated at Dr. Soetomo General Hospital in 2015-2020 had decubitus ulcers and 30% had diabetic ulcers. In addition, there are chronic lower extremities/limbs other than pressure wound due to fractures, burns, open wounds, and thromboembolism.

A total of 4 patients with burns experienced failure in the normal healing process so the burn wound became chronic wounds. Meanwhile, there were 3 patients with chronic wounds in other areas; 2 patients with chronic wounds in the sacrum area and 1 patient with chronic wounds in the scalp area.

Pressure sores or pressure ulcers are sores on the tissue due to prolonged exposure to pressure.[16] The occurrence of decubitus ulcers itself is not short, but a complex process and occurs due to multifactorial. Decubitus ulcers are generally located in areas that are prone to pressure such as heels, elbows, tailbone, hips, shoulders, and back of the head.[16] Patients with neurological disorders, cardiovascular disorders, malnutrition, and metabolic disorders tend to develop pressure ulcers.[17]

Diabetic ulcers are a common complication experienced by patients with uncontrolled diabetes mellitus.[11] Complications of diabetes mellitus are divided into two, acute and chronic. Acute complications of diabetes mellitus include ketoacidosis, hyperglycemia, and/or hypoglycemia.[18] Meanwhile, chronic complications in patients with diabetes mellitus can be in the form of microvascular complications and macrovascular complications. Diabetic ulcers are chronic macrovascular complications in people with diabetes mellitus.[18] Uncontrolled blood sugar can disrupt the arrangement of blood vessels and body metabolism, this can interfere with the normal wound healing process so that the wound healing process becomes long and difficult

to heal, resulting in chronic wounds.

Burn wound that become chronic wounds occur due to the presence of multifactor in the patient so it interferes with the normal healing process. Burn wound that become chronic wounds are common due to infection by opportunistic pathogens.[19] This is experienced by people who have weak immunity combined with damaged skin barrier due to burns. The presence of dead tissue and unfavorable tissue environmental conditions make burns susceptible to Pseudomonas spp infection.[19]

Chronic wounds on the legs can be in the form of varicose ulcers and artery ulcers. Varicose ulcers occur due to impaired blood flow in the veins, generally due to damage to the venous valves. Meanwhile, arterial ulcers occur due to arterial blood circulation disorders where the blood vessels are pinched by the surrounding tissue or inflammation of the blood vessel walls.[20]

Management of patients with chronic wounds performed by plastic surgeons at Dr. Soetomo General Hospital, Surabaya is by preparing wound bed and closing the wound with surgery using either a flap technique or a skin graft. Wound bed preparation includes debridement, wound exudate management, and bacterial control. All patients with chronic wounds who were treated at RSUD Dr. Soetomo in 2015-2020 received wound care or wound bed preparation, but only 34 patients had wound closures either in the form of flaps or skin grafts. Of the 19 patients who did not receive treatment for wound closure, 12 patients were declared cured and 7 patients were declared not cured. Patients who only received wound bed preparation were declared not healed due to death or outpatient treatment.

Management of chronic wounds generally includes 2 things, wound bed preparation and wound closure. These two things are interrelated to optimize the wound healing process.[4] The problems encountered in chronic wound patients can be treated by preparing wound beds. Wound bed preparation is the process of removing the existing barrier in the wound by performing debridement, bacterial control, and exudate management.[4]

Debridement is an attempt to remove nonvital or necrotic tissue. In wound bed preparation, it is important to eradicate the presence of infection, dead tissue, and optimize tissue perfusion to provide good wound conditions so that the healing process can be carried out optimally.[21] Debridement itself is done to maintain nerves, blood vessels, tendons, bones, and other important components.[4] Necrotic tissue or non-vital tissue in the wound not only inhibits the normal wound healing process, but can cause tissue loss of protein, osteomyelitis, systemic infection, amputation, and death.[4] After debridement, the wound will have better circulation and adequate oxygen supply.

Debridement is divided into surgical and non-surgical. Surgical debridement however also has drawbacks, such as high costs and pain. Non-surgical debridement includes enzymatic, autolytic, mechanical, and biological debridement.[4]

In addition to nonvital or necrotic tissue, the presence of exudate can affect the wound healing process so exudate control is important in the management of chronic wounds. Absorbent gauze is often chosen as the treatment for managing exudates.[22]

Wound bed preparation is also in the form of bacterial control. The presence of bacteria in wounds can be categorized into the contamination, colonization, critical colonization, and infection.[21] If there is a wound with signs and symptoms such as pus, odor, warmth, and erythema, with a bacterial count >10 ^{5} gr then the wound can be categorized as a wound with infection.[4] In addition to debridement, antibiotics are also important for prevention.

A wound that has been well prepared and clean without any signs of infection can then be closed.[4] The most basic wound closure is per sekundam where the wound heals spontaneously. This closure takes place naturally through epithelialization without surgical tools. The size of the wound also affects wound closure, large wounds or wounds that are not able to heal on their own can be done by primary suturing. If the wound cannot be treated with primary suturing, a skin graft is performed.[4] Skin grafting is the act of transferring part or all of the thickness of the skin from the donor area to the area in need, where the blood supply is needed to maintain the life of the transferred skin.[23] Other alternatives for wound closure when donor skin is insufficient for extensive wound closure are Cultured Epithelial Autograft (CEA), allograft, xenograft, and synthetic dressings.[4]

The outcome of the patients assessed in this study was the condition of the patients when they were discharged from the hospital. The patient's outcome can be seen from the condition of the patient, whether it is cured or not. From 2015-2020 at Dr. Soetomo General Hospital Surabaya, as many as 72% of patients with chronic wounds were discharged from the hospital in a healed state and 28% were discharged from the hospital unhealed. Patients with chronic wounds who were treated at Dr. Soetomo in 2015-2020 who were declared not cured, as many as 8 patient died, 3 patient forced discharge , and 4 become outpatient. The condition of the majority of patients with chronic wounds who were treated at Dr. Soetomo General Hospital Surabaya in a state of recovery when they were discharged from the hospital reflected that the

treatment of chronic wounds at Dr. Soetomo General Hospital Surabaya in 2015-2020 was quite good.

Based on some research about chronic wounds, whether or not the patient's chronic wounds have healed is based on their age, gender, past medical history, the presence or absence of problems with the wound such as infection and dead tissue (necrosis), presence or absence of peripheral arterial disease, the immune system, and lifestyle.[24] Based on the research objectives and the research results that have been obtained, the conclusion regarding the profile of patients with chronic wound treated at Dr. Soetomo General Hospital Surabaya are as follows: 1) Patients are dominated by elderly ages more than 46 years and mostly are male, 2) Three most common medical histories of patients before patient suffers from chronic wound are type 2 diabetes, hypertension, and trauma, 3) The majority of the diagnosis are patients with pressure ulcer (decubitus ulcer) and diabetic ulcer, 4) The clinical picture found is a problem with the presence of exudate, 5) All patients receive wound bed preparation but not all receive wound closure (flap and skin graft), 6) Most of the patient that has been discharge from the hospital are in a healed stage.

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