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EFFECTIVENESS OF JUBIRKURIHLAH GEL ON WOUND HEALING IN RATS (RATTUS NORVEGICUS)

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ABSTRACT
Jubirkurihlah (Ju: Jurangau, Bir: Gambir, Ku: Kunyik Bolai/Banglei, Rih: Sirih, Lah: Lada Hitam), extract is made and made into Jubirkurihlah Gel. The aim is to identify the effect of Jubirkurihlah Gel on wound healing. The research was designed quantitatively with experimental. The sample size is 100 rats (*Rattus norvegicus*) consisting of 25 for the Jubirkurihlah Gel intervention with a concentration of 25%, 25 using the Jubirkurihlah Gel with a concentration of 50%, and 25 using the Jubirkurihlah Gel with a concentration of 75% and 25 for the control. The experimental animals insist on two millimeters deep, and 1 centimeter long on the back. They grouped into four groups and observed until the wound healed. Data were analyzed univariately and bivariate using the ANOVA statistical test. The results of the study, Jubirkurihlah Gel is effective for Wound Healing in Rats (*Rattus norvegicus*), and none showed signs of inflammation in either the treatment or control. The longest healing was in the Control Group with a mean of 198 hours 64 minutes, and the lowest was the fastest using Jubirkurihlah Gel 25% (F1) with a mean of 103 hours 76 minutes. Recommendation for future research, Jubirkurihlah gel with a concentration of 25% needs to be tested on humans and needs to involve other professions, namely the Pharmacy Profession.

KEYWORD: Jubirkurihlah gel, Mice (R*attus norvegicus*), Nursing.

INTRODUCTION
Wounds are damage to tissue units/components caused by sharp or blunt trauma, explosions, chemicals, temperature changes, electric shocks, or animal bites. Specifically, there is a damaged or missing tissue substance (Suriadi, 2004). Wound healing is a process of replacing dead/damaged tissue with new and healthy tissue in the body by way of regeneration. It is said to be healed if the surfaces can reunite and the tissue strength reaches normal, covering two categories, namely, tissue recovery (tissue regeneration recovered as before). Both structure and function) and repair is restoration or replacement by connective tissue (Mawardi-Hasan, 2002). In related research conducted by Jean O. Latuheru entitled The effect of betel leaf (*pipes betle Linn*) on wound healing of rabbit skin incisions (*Oryctolagus cuniculus*), macroscopically on the third day there was a difference in the skin of rabbits that were given betel leaf and those that were not given betel leaf. In the wound that was given, betel leaves the wound dried up and was dark in color, the length of the wound began to decrease and wound union occurred. On the seventh day, the wound that was given betel leaf showed a black crust formed due to the remaining crushed betel leaf sticking and the length of the wound was shorter. In wounds that were not given betel leaves, redness was visible on the inside of the wound and the edges of the wound were still irregular. By the fourteenth day, the wound on the rabbit's skin had become smaller. The wound that was given betel leaf showed that the wound had closed completely, the wound that was not given betel leaf seemed to have shrunk, but a wound with a red color in the middle was visible.

The tradition of the people who still use Jubirkurihlah material for the treatment of the umbilical cord turns out to heal the umbilical cord of newborns faster than modern methods (based on the results of a previous study in 2016). The results of the study used betel-feeding water in the treatment of umbilical cord injuries in newborns, separation of the umbilical cord at 4.037 days (the fastest), alcohol at 6.201 days, and sterile gauze at 5.646 days. The results of the mean difference test for the three groups showed a significant difference with p value of 0,000 (Masnun, 2016).

Research on the effectiveness of extracts (jurangau, gambir, turmeric bolai, betel, black pepper) abbreviated

as Jubirkurihlah with concentrations of 15%, 20%, and 25% on wound healing in rats (*Rattus norvegicus*), the results found no signs of infection in the three treatment groups, the average healing time of wounds treated with extracts was 15% 5.66 days, 20% 3.84 days, 25% 3.43 days, the test results were different on average with *p* value 0,006 (Masnun, 2017).

Research on "Effectiveness of Jubirkurihlah Extract, Betadine Ointment, and Gentamycin Ointment on Wound Healing in Mice (*Rattus Norvegicus*), the longest wound healing was wound care using Gentamycin ointment (99 hours 12 minutes), the fastest was Jubirkurihlah Extract 75% (74 hours 24 minutes) (Masnun, 2019).

Based on the background of this problem, researchers are interested in researching "Effectiveness of Jubirkurihlah Gel on Wound Healing in Rats (*Rattus Norvegicus*), the reason is that there are several advantages of gel preparations (Voigt, 1994), namely the ability to spread well on the skin, cooling effect, no physiological inhibition of creeper function and ease of washing with water. The formulation of the research problem is "Is Jubirkurihlah Gel Effective for Wound Healing in Rats (*Rattus Norvegicus*)?"

MATERIALS AND METHODS

This study uses an experimental research design. Experiments are observations under artificial conditions (*artificial conditions*) where these conditions are created and regulated by the researcher (Nazir, M, 2011). Jubirkurihlah extract made in the following way: betel leaf finely cut and aerated, gambier finely ground in a mortar, kunyik bolai and gorse cut and finely sliced, finely ground black pepper. Ingredients that have been cut and finely sliced and crushed are put into a dark bottle with 96% ethanol solvent until the ingredients are submerged, then the bottle is closed, left for 5 days while occasionally stirring/shaking. After 5 days it was filtered and the result of the filter (macerate) was thickened using a "Rotary Evaporator" repeated up to three times.

Figure 1: The process of making jubirkurihlah extract using the "Rotary Evaporator"

Furthermore, from the Jubirkurihlah extract, Jubirkurihlah Gel is made. According to Khristantyo (2010), in principle the method for making semisolid preparations is divided into two: Melting method (fusion), where the carrier and the active substance are melted together and stirred to form a homogeneous phase substance, in this case, it is necessary to pay attention to the stability of the active ingredient at different temperatures. high at the time of melting, Trituration, substances that do not dissolve are mixed with a small amount of the base to be used or with one of the auxiliary substances, then proceed with the addition of the base, organic solvents can also be used to dissolve the active substance first and then mixed with the base to be used.

Furthermore, after the animals tried to adapt (10 days), they gave treatment which began with anesthesia using chloroform by dripping on cotton as much as 20 drops, then the cotton was put into a jar, after that the animals were put into a jar, after being limp then removed from the jar and shaving the backs of experimental animals. Disinfect the backs of experimental animals that have been shaved using alcohol swabs, then make incisions on the backs of experimental animals with a depth of 2 mm and a length of 1 cm, then treated using jubirkurihlah gel (25 individuals with a concentration of 15%, 25 individuals with a concentration of 50% and 25 individuals with a concentration of 75%. Data was collected by identifying and observing the effect of wound care using jubirkurihlah gel every day to see signs of inflammation (redness, swelling, presence of pus) and the length of time for wound healing. The data were then analyzed univariately and bivariately. The hypothesis of this study is "There is an effect of jubirkurihlah gel on the healing of incisions Rattus *norvegicus.*

RESULTS AND DISCUSSION

Result

The implementation starts from October to November 2020 with a total sample of 100 rats (*Rattus Norvegicus*)" consisting of 25 rats (*Rattus norvegicus*) treated using 25% jubirkurihlah gel, 25 rats (*Rattus norvegicus*) treated using 50% jubirkurihlah gel, 25 rats (*Rattus norvegicus*) was treated using 75% jubirkurihlah gel, 25 rats (*Rattus norvegicus*) was treated only by

covering the wound with sterile gauze as the control group. The results of this study were analyzed using univariate analysis and bivariate analysis as follows.

Table 1: Identification results signs of Inflammation in Wounds Treated Using Jubirkurih Gel 25%, 50%, 75%, and Wounds Only Treated with Sterile gauze in Rats (*Rattus Norvegicus*) Year 2020.

No	Type of Treatment	Inflamation Sign	
		Yes (%)	No (%)
1.	Jubirkurihlah 25 % Gel	0 (0%)	25 (100%)
2.	Jubirkurihlah 50 % Gel	0 (0%)	25 (100%)
3.	Jubirkurihlah 75 % Gel	0 (0%)	25 (100%)
4.	Control	0 (0%)	25 (100%)
	Total	0%	100 (100%)

One hundred rats (*Rattus norvegicus*) were treated using 25% jubirkurihlah gel, 50% jubirkurihlah gel, 75% jubirkurihlah gel, and those whose wounds were only closed using sterile gauze which each group consisting of 25 rats (*Rattus norvegicus*). They observed from the start of the wound until the wound was declared healed (the wound was tightly closed and healed), and all groups found no signs of inflammation.

Next, the results of measuring the effect of jubirkurihlah gel on wound healing in rats are presented in *Rattus norvegicus* about the length of time for wound healing in each treatment and control group to answer the specific objectives of this study, especially for the objectives of the second part.

Table 2: Length of Wound Healing Time in the Treatment Treatment Group Using Jubirkurihlah Gel 25%, 50%, 75%, and Control in Mice (*Rattus Norvegicus*) Year 2020.

Groups	N	Mean	*p value*
Control	25	198.64	0,000
Jubirkurihlah Gel 25%	25	103.76	
Jubirkurihlah Gel 50%	25	115.48	
Jubirkurihlah Gel 75%	25	124.08	

Table 2 above shows that the highest (longest) duration of the wound healing process was wound care that was only closed using sterile gauze (Control Group), namely 198 hours 64 minutes and the lowest (fastest) was using 25% Jubirkurihlah Gel, namely 103 hours 76 minutes.

There is a treatment group 1 (F1) whose wounds were treated with a 25% concentration of jubirkurihlah gel in 25 rats(*Rattus norvegicus*) Wound healing time obtained with Mean103 Hours 76 Minutes, treatment group 2 (F2) whose wounds were treated with 50% jubirkurihlah gel concentration in 25 rats (*Rattus norvegicus*) Wound healing time obtained with Mean115 hours 48 minutes, in treatment group 3 (F3) whose wounds were treated with 75% jubirkurihlah gel concentration in 25 rats (*Rattus norvegicus*) Wound healing time obtained with Mean 122 hours 16 minutes, in group 4 (Control) the wound was only closed with sterile gauze in 25 rats (*Rattus norvegicus*) Wound healing time obtained with Mean198 hours 64 minutes.

From the results of this treatment, it can be seen that the lower the gel concentration the faster the wound healing process in rats(*Rattus norvegicus*). And vice versa, the higher the gel concentration, the longer the wound healing process in rats(*Rattus norvegicus*).

Next, the results of the Identification of Wound Healing Time Using Jubirkurihlah Gel in Rats (*Rattus norvegicus*) Year 2020 regarding the healing time of wounds which in the ratio are included/ classified as fast or long.

Table 3: Results of Fast Identification and Long Wound Healing Time Using Jubirkurihlah Gel in Rats (*Rattus norvegicus*) Year 2020.

	fast		slow		mean
	f	%	*f*	%	
F1/ concentration 25%	17	68	8	32	103.76
F2/ concentration 50%	9	36	16	64	115.48
F3/ concentration 75%	20	80	5	20	124.08

Table 3 above shows the results of identifying the wound healing time, that the wound healing process in treatment group 1 (F1) whose wounds were treated with a 25% concentration of jubirkurihlah gel in 25 rats (*Rattus norvegicus*) obtained the wound healing time with Mean 103 Hours 76 Minutes, there were 17 (68%) rats (*Rattus norvegicus*) experienced a fast wound healing process with a mean <103.76 and 8 (32%) rats (*Rattus*

Norvegicus) experienced a long healing process with a mean >103.76. In the treatment group 2 (F2), the wound was treated with a 50% concentration of jubirkurihlah gel in 25 rats (*Rattus norvegicus*) Wound healing time obtained with a Mean of 115 hours 48 minutes, there were 9 (36%) rats (*Rattus norvegicus*) experienced a fast wound healing process with a mean <115.48 and 16 (64%) rats (*Rattus norvegicus*) had a long wound healing process with a mean > 115.48. In the treatment group 3 (F3), the wound was treated with jubirkurih gel with a concentration of 75% in 25 rats (*Rattus norvegicus*) obtained the wound healing time with a mean of 122 hours 16 minutes, there were 20 (80%) rats (*Rattus norvegicus*) experienced a fast wound healing process with a mean <124.08 and 5 (20%) rats (*Rattus norvegicus*) had a long wound healing process with a mean > 124.08.

Table 4: Statistical Test Results for the Effectiveness of Wound Treatment with Jubirkurihlah Gel in Rats (*Rattus Norvegicus)* Control Group with a Concentration of 25% in 2020.

Concentration	Mean	*p* Value
Control	198.64	0.000
25%	103.76	

Based on the table above, the results of a comparison between the control group and the jubirkurihlah gel were 25%, in the control group the mean was 198.64 and in the jubirkurihlah gel at a concentration of 25% the mean was 103.76 with *p* value 0.000 at α 0.05 which means*p* value < α, and it was concluded that there was a significant difference between the control group compared to the 25% jubirkurihlah gel which means that the 25% concentration of jubirkurihlah gel was more effective for healing wounds compared to the Control Group.

Table 5: Statistical Test Results for the Effectiveness of Wound Treatment with Jubirkurihlah Gel in Rats (*Rattus Norvegicus)* Control Group with 50% Concentration in 2020.

Concentration	Mean	*p* Value
control	198.64	0.000
50%	115.48	

Based on the table above, the results of a comparison between the control group and the jubirkurihlah gel were 25%, in the control group the mean was 198.64 and in the jubirkurihlah gel at a concentration of 25% the mean was 103.76 with *p* value 0.000 at α 0.05 which means value < α, and it was concluded that there was a significant difference between the control group compared to the 25% jubirkurihlah gel which means that the 25% concentration of jubirkurihlah gel was more effective for healing wounds compared to the Control Group.

Table 6: Statistical Test Results for the Effectiveness of Wound Treatment with Jubirkurihlah Gel in Rats (*Rattus Norvegicus)* Control Group with a Concentration of 75% in 2020.

Concentration	Mean	*p* Value
control	198.64	0.000
75%	124.08	

Based on the table above, the results of a comparison between the control group compared to the jubirkurihlah gel concentration of 75%, the control group obtained a mean of 198.64 and the jubirkurihlah gel concentration of 75% obtained a mean of 124.08 with *p* value 0.000 at α 0.05 which means *p* value < α, and it was concluded that there was a significant difference between the control group compared to the 75% concentration of jubirkurihlah gel, which means that the 75% concentration of jubirkurihlah gel was more effective for wound healing than the control group.

Table 7: Statistical Test Results for the Effectiveness of Wound Treatment with Jubirkurihlah Gel in Rats (*Rattus Norvegicus)* Concentration of 25% with 50% in 2020.

Concentration	Mean	*p* Value
25%	103.76	0.065
50%	115.48	

Based on the table above, the results of a comparison between Jubirkurihlah gel with a concentration of 25% compared with jubirkurihlah gel with a concentration of 50%, in Jubirkurihlah gel with a concentration of 25%, the mean was 103.76 and in jubirkurihlah gel with a concentration of 50%, it was obtained a mean of 115.48 with *p* value 0.065 at α 0.05 which means *p-value*> α, and it was concluded that there was no significant difference between Jubirkurihlah gel with a concentration of 25% compared with jubirkurihlah gel

with a concentration of 50%, which means that jubirkurihlah gel with a concentration of 25% and jubirkurihlah gel with a concentration of 50% were both effective for healing wounds.

Table 8: Statistical Test Results for the Effectiveness of Wound Treatment with Jubirkurihlah Gel in Rats (*Rattus Norvegicus)* Concentration of 25% with 75% in 2020.

Concentration	Mean	*p* Value
25%	103.76	0.000
75%	124.08	

Based on the table above, the results of a comparison between Jubirkurihlah Gel with a concentration of 25% compared with Jubirkurihlah gel with a concentration of 75%, in Jubirkurihlah Gel with a concentration of 25%, the mean103,76 and jubirkurih gel the concentration of 75% is the mean124,08 with *p* value 0.000 at α 0.05 which means *p-value* < α, and it was concluded that there was a significant difference between Jubirkurihlah Gel concentration of 25% compared to Jubirkurihlah gel concentration of 75%, which means Jubirkurihlah Gel concentration of 25% was more effective for healing wounds than Jubirkurihlah Gel concentration of 75%.

Table 9: Statistical Test Results for the Effectiveness of Wound Treatment with Jubirkurihlah Gel in Rats (*Rattus Norvegicus)* Concentration of 50% with 75% in 2020.

Concentration	Mean	*p* Value
50%	115.48	0.260
75%	124.08	

Based on the table above, the results of a comparison between Jubirkurihlah gel with a concentration of 50% compared with jubirkurihlah gel with a concentration of 75%, Jubirkurihlah gel with a concentration of 50% obtained a mean of 115.48 and in jubirkurihlah gel with a concentration of 75% obtained a mean of 124.08 with *p* value 0.260 at α 0.05 which means *p* value > α, and it was concluded that there was no significant difference between Jubirkurihlah gel with a concentration of 50% compared with jubirkurihlah gel with a concentration of 75%, which means that jubirkurihlah gel with a concentration of 50% and jubirkurihlah gel with a concentration of 75% were both effective for healing wounds.

DISCUSSION

Based on research conducted by making incisions 2 mm deep and 1 cm long using a sterile instrument and sterile material on the backs of 100 rats (*Rattus Norvegicus*) which were grouped into 4 treatment groups, namely F1 (25 rats) treated with 25% concentration jubirkurihlah gel, F2 (25 rats) treated with 50% concentration jubirkurihlah gel, F3 (25 rats) treated with 75% jubirkurihlah gel and control (25 rats) the wound was only closed using sterile gauze, then treated until healed (the wound was closed and the scars were no longer visible) using the material already mentioned, treated once a day, the result was that there were no signs of inflammation in all treatment groups or in 75 rats (*Rattus Norvegicus*) as well as in 25 mice (*Rattus Norvegicus*) as a control group.

In all treatment groups totaling 75 rats (*Rattus Norvegicus*) no signs of infection were found during the treatment process, all types of gel concentrations used turned out to be able to heal the incisions in these rats. The basic ingredients for making jubirkurihlah gel consisting of Jurangau, Gambir, Kunyik Bolai, Betel, and Black Pepper (Jubirkurihlah) turned out to be able to heal the incisions that were treated on the 75 rats (*Rattus Norvegicus*).

The basic ingredients of Jubirkurihlah gel contain compounds that are useful for accelerating wound healing time, with the presence of flavonoid compounds which act as anti-bacterial and saponin compounds in betel leaves have structural proteins that can stimulate collagen formation so that they play a role in the wound healing process and have anti-bacterial properties.

Inside the betel leaf there is Kavacrol which is a disinfectant and anti-fungal, so it can be used as an anti-septic medicine for bad breath and vaginal discharge. Other substances, namely eugenol and metal eugenol, can be used to relieve toothache traditionally. Betel leaf has a distinctive aroma because of its essential oil content. High levels of eugenol determine the quality of the leaves. Terpenes only function as a spicy flavor. The essential oil of betel leaf contains flying oil (*betlephenol*), sesquiterpene, starch, diastase, sugar, tannins, and chavicol that have the power to kill germs, antioxidants and functions (Achyad & Rasyida, 2000).

Research related to research on astringent and hemostatic properties by Zulfadli, 1989. Pharmacy, FMIPA UNAND. Microbiological tests of Gambir leaf and twig extracts have been carried out against several bacteria that cause diarrhea in vitro. From the results of these studies, it turns out that extracts of leaves and branches of Gambir can inhibit the growth of bacteria that cause diarrhea. Traditionally, the Jeringau plant has been widely used as a medicine for stomachaches and skin diseases (Rismunandar, 1988). Jeringau rhizome is efficacious as a carminative, spasmolytic, and

diaphoretic which is useful as a sedative, stomach, digestive tranquilizer, spleen medicine, relieves pain, increases appetite, tonic, relieves inflammation, relieves nasal congestion, clears voice, and is an antiseptic ingredient. Examples of diseases that can be treated with Jeringau include swelling, scabies, ringworm, swollen spleen, cowpox, nosebleeds, fever, and others (Atsiri Indonesia, 2006). In India, cassava rhizome flour is used as an anthelmintic and herbal medicine. In native eastern medicine, Jeringau rhizome is widely used for medicinal purposes-dyspepsia (medicine for children with diarrhea), *bronchitis*, and lozenge (chewable for sore throat).

Kunyik bolai/ Bangle (*Mountain ginger*) includes plants that are rich in benefits, as are most rhizome plants. The benefits of the bangle are supported by the components of its chemical compounds, most of which are essential oils, where these compounds have a positive effect on the body. Other compounds contained in the bangle include cineole, pinene, sesquiterpenes, minerals, albuminoids, fats, bitter latex, and organic acids.

Black pepper contains antioxidants that combat the growth of bad bacteria, the chemical ingredients in black pepper are saponins, flavonoids, essential oils, cavicin, resin, egg white, starch, piperine, piperiline, piperoleine, piperanine, piperonal, dihydrocarveol, kanyo-fillene oxide, krypton, tran piocarrol, and pepper oil. The chemical properties of pepper are spicy and have a very distinctive aroma.

CONCLUSION

There were no signs of inflammation during the wound-healing process in the four groups. The highest (longest) wound healing time was wound care which was only covered using sterile gauze (Control Group), namely 198 hours 64 minutes and the lowest (fastest) was using Jubirkurihlah Gel with a concentration of 25%, namely 103 hours 76 minutes. In the treatment group 1 (F1) with jubirkurihlah gel concentration of 25%, 17 rats (68%) experienced a fast healing process with a mean <103.76, and 8 rats (32%) experienced a long healing process with a mean > 103.76. In the treatment group 2 (F2) with a 50% concentration of jubirkurihlah gel in 25 rats (Rattus norvegicus), there were 9 rats (36%) experienced a fast healing process with a mean <115.48 and 16 rats (64%) experienced a slow healing process, mean > 115.48. In the treatment group 3 (F3) with a 75% concentration of jubirkurihlah gel in 25 rats (Rattus norvegicus), there were 20 rats (80%) experienced a fast healing process with a mean <124.08, and 5 rats (20%) experienced a slow healing process. old with a mean > 124.08. On the results of statistical tests on the effectiveness of wound care with jubirkurihlah gel, in the control group with a concentration of 25%, 50%, and 75% it was concluded that there was a significant difference between the control group compared to jubirkurihlah gel 25%, 50%, 75% which means that the gel jubirkurihlah concentrations of 25%, 50%, 75% are more effective for treating or healing wounds compared to the Control Group with a p-value of 0.000 (α<0.05).

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