DAFTAR PUSTAKA

Akbaba, M., Alver, A., Kul, S., & Ozer, E. (2016). Determination of skin wound age by using cytokines as potential markers. *Journal of Forensic and Legal Medicinen*, *44*, 14–19. https://doi.org/10.1016/j.jflm.2016.08.011

Betz, P. (1994). Histological and enzyme histochemical parameters for the age estimation of human skin wounds. *International Journal of Legal Medicine*, *107*(2), 60–68. https://doi.org/10.1007/BF01225491

Casse, J., Martrille, L., Vignaud, J., & Gauchotte, G. (2015). Skin wounds vitality markers in forensic pathology : An updated review, *0*(0), 1–10. https://doi.org/10.1177/0025802415590175

F. Al-Kholy, A. (2016). Tissue Extract Fluid Cytokine Levels as Markers for Wound Vitality. *International Journal of Sciences*, *5*(06), 87–94. https://doi.org/10.18483/ijsci.1055

Gantwerker, E. A., & Hom, D. B. (2011). Skin: Histology and Physiology of Wound Healing. *Facial Plastic Surgery Clinics of North America*, *19*(3), 441–453. https://doi.org/10.1016/j.fsc.2011.06.009

Grellner, W., Georg, T., & Wilske, J. (2000). Quantitative analysis of proinflammatory cytokines (IL-1 b , IL-6 , TNF- a) in human skin wounds. *Forensic Science International*, *113*, 251–264.

Grellner, W., & Madea, B. (2007). Demands on scientific studies : Vitality of wounds and wound age estimation. *Forensic Science International*, *165*(2007), 150–154. https://doi.org/10.1016/j.forsciint.2006.05.029

Kondo, T. (2019). Timing of skin wounds, *9*(2007), 109–114. https://doi.org/10.1016/j.legalmed.2006.11.009

Li, N., Du, Q., Bai, R., & Sun, J. (2020). Vitality and wound-age estimation in forensic pathology: review and future prospects. *Forensic Sciences Research*, *5*(1), 15–24. https://doi.org/10.1080/20961790.2018.1445441

Mast, B. A., & Schultz, G. S. (1996). Interactions of cytokines, growth factors, and proteases in acute and chronic wounds. *Wound Repair and Regeneration*, *4*(4), 411–420. https://doi.org/10.1046/j.1524-475X.1996.40404.x

Ming chu, W. (2013). Tumor Necrosis Factor. *National Institutes of Health*, *328*(2), 222–225. https://doi.org/10.1016/j.canlet.2012.10.014.Tumor

Nerchan, E., Mallo, J. F., Mallo, N. T. S., Skripsi, K., Kedokteran, F., Sam, U., & Manado, R. (2015). Pola Luka Pada Kematian Akibat Kekerasan Tajam Di Bagian Ilmu Kedokteran Forensik dan Medikolegal RSUP Prof. Dr. R. D. Kandou Manado Periode 2013. *Jurnal E-Clinic*, *3*, 640–645.

Riskesdas. (2018). Cedera. In *Laporan Nasional RISKESDAS 2018* (pp. 247–255). Balitbangkes.

Ritsu, M., Kawakami, K., Kanno, E., Tanno, H., & Ishii, K. (2016). Critical role of tumor necrosis factor- a in the early process of wound healing in skin. *Journal of Dermatology & Dermatologic Surgery*, 1–6. https://doi.org/10.1016/j.jdds.2016.09.001

Schmidt, U. (2013a). Sharp Trauma. In *Encyclopedia of Forensic Sciences* (2nd ed., pp. 39–46). Elsevier Ltd. https://doi.org/10.1016/B978-0-12-382165-2.00161-6

Sgnoc, R., & Gruber, J. (2013). Age-Related Aspects of Cutaneous.pdf. *Gerontology*, *59*, 159–164.

Takamiya, M., Fujita, S., Saigusa, K., & Aoki, Y. (2008). Simultaneous detection of eight cytokines in human dermal wounds with a multiplex bead-based immunoassay for wound age estimation. *International Journal of Legal Medicine*, *122*(2), 143–148. https://doi.org/10.1007/s00414-007-0183-5

Thiruvoth, F. M., Mohapatra, D. P., Sivakumar, D. K., Chittoria, R. K., & Nandhagopal, V. (2015). Current concepts in the physiology of adult wound healing. *Plastic and Aesthetic Research*, *2*(5), 250–256. https://doi.org/10.4103/2347-9264.158851

Verma, G. B. G. P. S. K. (2015). *Forensic Medicine and Toxicology*. *The Health Sciences Publishere Health Sciences Publisher* (Third). London; Philadelphia. https://doi.org/10.5005/jp/books/12943_8

Zomer, H. D., & Trentin, A. G. (2018). Skin wound healing in humans and mice: Challenges in translational research. *Journal of Dermatological Science*, *90*(1), 3–12. https://doi.org/10.1016/j.jdermsci.2017.12.009

LAMPIRAN

Lampiran 1. Data Mentah Hasil Penelitian

Kadar TNF-α & Hitung Neutrofil Pada Kelompok Kontrol

No	Hasil Sampel Kelompok Kontrol		
	Kulit Elisa (pg/ml)	Darah Elisa (pg/ml)	HE
1	162.170	150.213	0
2	187.754	351.978	0
3	818.451	111.216	0
4	41.706	157.490	-

Kadar TNF-α & Hitung Neutrofil Pada Kelompok 1 Jam Post Trauma

No	Hasil Sampel		
	Kulit Elisa (pg/ml)	Darah Elisa (pg/ml)	HE
1	61.817	135.196	0
2	53.564	149.915	0
3	71.806	53.432	15
4	40.582	58.162	-

Kadar TNF-α & Hitung Neutrofil Pada Kelompok 3 Jam Post Trauma

No	Hasil Sampel		
	Kulit Elisa (pg/ml)	Darah Elisa (pg/ml)	HE
1	38.399	50.091	385
2	37.373	101.459	5
3	47.677	60.279	7
4	91.569	40.565	-

Kadar TNF-α & Hitung Neutrofil Pada Kelompok 12 Jam Post Trauma

No	Hasil Sampel		
	Kulit Elisa (pg/ml)	Darah Elisa (pg/ml)	HE
1	80.935	105.626	100
2	86.045	123.686	16
3	38.713	86.707	223
4	243.289	198.041	-

Kadar TNF-α & Hitung Neutrofil Pada Kelompok 24 Jam Post Trauma

No	Hasil Sampel		
	Kulit Elisa (pg/ml)	Darah Elisa (pg/ml)	HE
1	68.879	111.613	876
2	285.065	0	479
3	390.578	100.863	782
4	309.988	85.218	-

Kadar TNF-α & Hitung Neutrofil Pada Kelompok 48 Jam Post Trauma

No	Hasil Sampel		
	Kulit Elisa (pg/ml)	Darah Elisa (pg/ml)	HE
1	300.875	144.888	4
2	120.494	109.529	202
3	164.601	287.578	18
4	110,786	182,330	-

Kadar TNF-α & Hitung Neutrofil Pada Kelompok 72 Jam Post Trauma

No	Hasil Sampel		
	Kulit Elisa (pg/ml)	Darah Elisa (pg/ml)	HE
1	59.088	416.096	22
2	51.613	112.903	21
3	74.965	154.546	12
4	76,850	252,915	-

Lampiran 2. Hasil Olah Data Statistik

Tumor Necrosis Factor-α (TNF-α)

Case Processing Summary

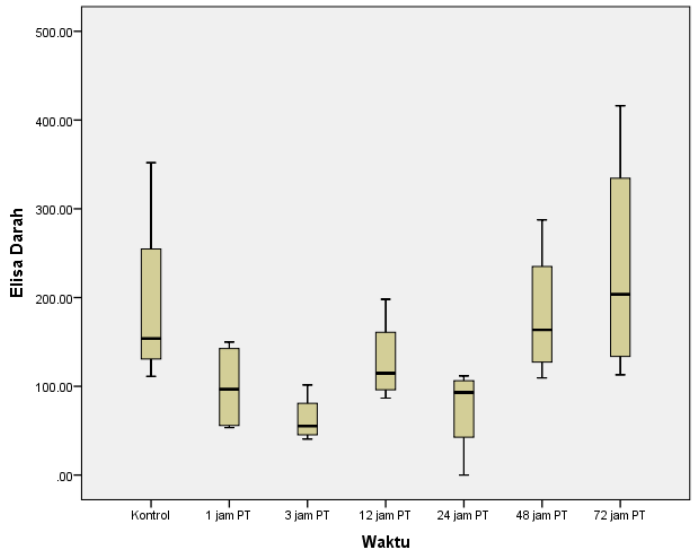
		Cases					
		Valid		Missing		Total	
	Waktu	N	Percent	N	Percent	N	Percent
Elisa Darah	Kontrol	4	100.0%	0	0.0%	4	100.0%
	1 jam PT	4	100.0%	0	0.0%	4	100.0%
	3 jam PT	4	100.0%	0	0.0%	4	100.0%
	12 jam PT	4	100.0%	0	0.0%	4	100.0%
	24 jam PT	4	100.0%	0	0.0%	4	100.0%
	48 jam PT	4	100.0%	0	0.0%	4	100.0%
	72 jam PT	4	100.0%	0	0.0%	4	100.0%
Elisa Kulit	Kontrol	4	100.0%	0	0.0%	4	100.0%
	1 jam PT	4	100.0%	0	0.0%	4	100.0%
	3 jam PT	4	100.0%	0	0.0%	4	100.0%
	12 jam PT	4	100.0%	0	0.0%	4	100.0%
	24 jam PT	4	100.0%	0	0.0%	4	100.0%
	48 jam PT	4	100.0%	0	0.0%	4	100.0%
	72 jam PT	4	100.0%	0	0.0%	4	100.0%

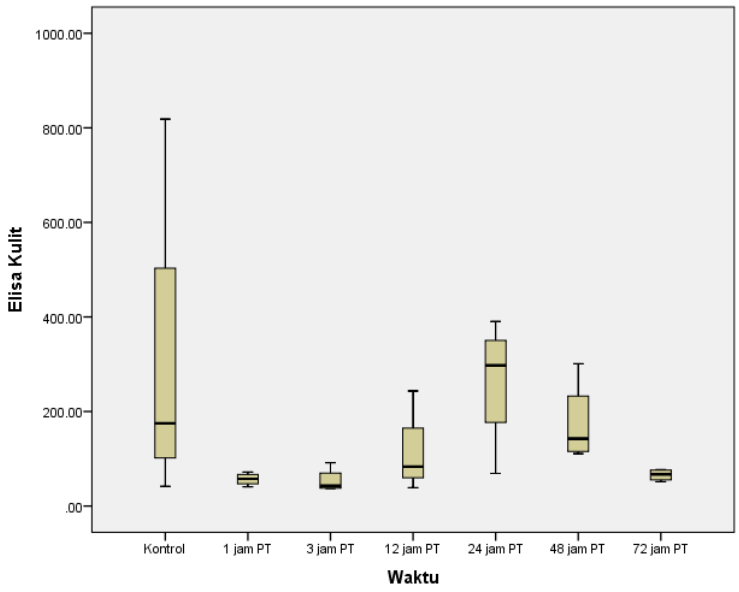
Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Waktu	Statistic	df	Sig.	Statistic	df	Sig.
Elisa Darah	Kontrol	.378	4	.	.793	4	.089
	1 jam PT	.292	4	.	.819	4	.140
	3 jam PT	.292	4	.	.879	4	.336
	12 jam PT	.289	4	.	.887	4	.369
	24 jam PT	.334	4	.	.813	4	.128
	48 jam PT	.244	4	.	.930	4	.597
	72 jam PT	.223	4	.	.927	4	.576
Elisa Kulit	Kontrol	.379	4	.	.789	4	.084
	1 jam PT	.149	4	.	.995	4	.983
	3 jam PT	.344	4	.	.763	4	.051
	12 jam PT	.365	4	.	.825	4	.156
	24 jam PT	.312	4	.	.895	4	.409
	48 jam PT	.294	4	.	.826	4	.158

72 jam PT	.276	4	.	.883	4	.352

a. Lilliefors Significance Correction





Parametric Tests – Elisa Darah & Kulit

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Elisa Darah	Between Groups	101323.904	6	16887.317	2.687	.043
	Within Groups	131990.554	21	6285.264		
	Total	233314.458	27			
Elisa Kulit	Between Groups	252648.237	6	42108.039	1.866	.135
	Within Groups	473968.314	21	22569.920		
	Total	726616.550	27			

LSD

Dependent Variable	(I) Waktu	(J) Waktu	Mean Difference (I-J)	Std. Error	Sig.
Elisa Darah	Kontrol	1 jam PT	93.54777	56.05919	.110
		3 jam PT	129.62563*	56.05919	.031
		12 jam PT	64.20915	56.05919	.265
		24 jam PT	118.30061*	56.05919	.047
		48 jam PT	11.64280	56.05919	.837
		72 jam PT	-41.39075	56.05919	.468
	1 jam PT	Kontrol	-93.54777	56.05919	.110
		3 jam PT	36.07786	56.05919	.527
		12 jam PT	-29.33861	56.05919	.606
		24 jam PT	24.75284	56.05919	.663
		48 jam PT	-81.90497	56.05919	.159
		72 jam PT	-134.93852*	56.05919	.025
	3 jam PT	Kontrol	-129.62563*	56.05919	.031
		1 jam PT	-36.07786	56.05919	.527
		12 jam PT	-65.41648	56.05919	.256
		24 jam PT	-11.32502	56.05919	.842
		48 jam PT	-117.98283*	56.05919	.048
		72 jam PT	-171.01638*	56.05919	.006
	12 jam PT	Kontrol	-64.20915	56.05919	.265
		1 jam PT	29.33861	56.05919	.606
		3 jam PT	65.41648	56.05919	.256
		24 jam PT	54.09146	56.05919	.346
		48 jam PT	-52.56635	56.05919	.359
		72 jam PT	-105.59990	56.05919	.074
	24 jam PT	Kontrol	-118.30061*	56.05919	.047
		1 jam PT	-24.75284	56.05919	.663
		3 jam PT	11.32502	56.05919	.842
		12 jam PT	-54.09146	56.05919	.346
		48 jam PT	-106.65781	56.05919	.071
		72 jam PT	-159.69136*	56.05919	.010
	48 jam PT	Kontrol	-11.64280	56.05919	.837
		1 jam PT	81.90497	56.05919	.159
		3 jam PT	117.98283*	56.05919	.048
		12 jam PT	52.56635	56.05919	.359

		24 jam PT	106.65781	56.05919	.071
		72 jam PT	-53.03355	56.05919	.355
	72 jam PT	Kontrol	41.39075	56.05919	.468
		1 jam PT	134.93852*	56.05919	.025
		3 jam PT	171.01638*	56.05919	.006
		12 jam PT	105.59990	56.05919	.074
		24 jam PT	159.69136*	56.05919	.010
		48 jam PT	53.03355	56.05919	.355

Neutrofil

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	Waktu	N	Percent	N	Percent	N	Percent
Hitung Netrofil	Kontrol	3	100.0%	0	0.0%	3	100.0%
	1 jam PT	3	100.0%	0	0.0%	3	100.0%
	3 jam PT	3	100.0%	0	0.0%	3	100.0%
	12 jam PT	3	100.0%	0	0.0%	3	100.0%
	24 jam PT	3	100.0%	0	0.0%	3	100.0%
	48 jam PT	3	100.0%	0	0.0%	3	100.0%
	72 jam PT	3	100.0%	0	0.0%	3	100.0%

Descriptives[a]

	Waktu			Statistic	Std. Error
Hitung Netrofil	1 jam PT	Mean		5.0000	5.00000
		95% Confidence Interval for Mean	Lower Bound	-16.5133	
			Upper Bound	26.5133	
		5% Trimmed Mean		.	
		Median		.0000	
		Variance		75.000	
		Std. Deviation		8.66025	
		Minimum		.00	
		Maximum		15.00	
		Range		15.00	
		Interquartile Range		.	
		Skewness		1.732	1.225
		Kurtosis		.	.
	3 jam PT	Mean		132.3333	126.33465
		95% Confidence Interval for Mean	Lower Bound	-411.2408	
			Upper Bound	675.9075	
		5% Trimmed Mean		.	
		Median		7.0000	
		Variance		47881.333	
		Std. Deviation		218.81804	
		Minimum		5.00	
		Maximum		385.00	
		Range		380.00	

	Interquartile Range		.	
	Skewness		1.732	1.225
	Kurtosis		.	.
12 jam PT	Mean		113.0000	60.10824
	95% Confidence Interval for Mean	Lower Bound	-145.6249	
		Upper Bound	371.6249	
	5% Trimmed Mean		.	
	Median		100.0000	
	Variance		10839.000	
	Std. Deviation		104.11052	
	Minimum		16.00	
	Maximum		223.00	
	Range		207.00	
	Interquartile Range		.	
	Skewness		.553	1.225
	Kurtosis		.	.
24 jam PT	Mean		712.3333	119.78082
	95% Confidence Interval for Mean	Lower Bound	196.9581	
		Upper Bound	1227.7086	
	5% Trimmed Mean		.	
	Median		782.0000	
	Variance		43042.333	
	Std. Deviation		207.46646	
	Minimum		479.00	
	Maximum		876.00	
	Range		397.00	
	Interquartile Range		.	
	Skewness		-1.341	1.225
	Kurtosis		.	.
48 jam PT	Mean		74.6667	63.79481
	95% Confidence Interval for Mean	Lower Bound	-199.8202	
		Upper Bound	349.1536	
	5% Trimmed Mean		.	
	Median		18.0000	
	Variance		12209.333	
	Std. Deviation		110.49585	
	Minimum		4.00	

		Maximum		202.00	
		Range		198.00	
		Interquartile Range		.	
		Skewness		1.701	1.225
		Kurtosis		.	.
	72 jam PT	Mean		18.3333	3.17980
		95% Confidence Interval for Mean	Lower Bound	4.6518	
			Upper Bound	32.0149	
		5% Trimmed Mean		.	
		Median		21.0000	
		Variance		30.333	
		Std. Deviation		5.50757	
		Minimum		12.00	
		Maximum		22.00	
		Range		10.00	
		Interquartile Range		.	
		Skewness		-1.668	1.225
		Kurtosis		.	.

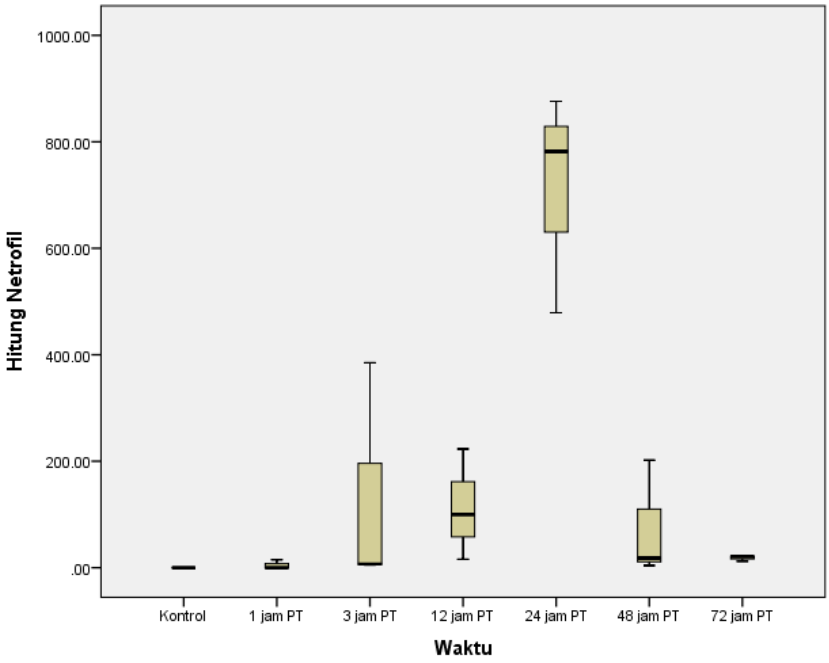
a. Hitung Netrofil is constant when Waktu = Kontrol. It has been omitted.

Tests of Normality[a]

		Kolmogorov-Smirnov[b]			Shapiro-Wilk		
	Waktu	Statistic	df	Sig.	Statistic	df	Sig.
Hitung Netrofil	1 jam PT	.385	3	.	.750	3	.000
	3 jam PT	.383	3	.	.754	3	.009
	12 jam PT	.216	3	.	.988	3	.793
	24 jam PT	.298	3	.	.915	3	.436
	48 jam PT	.363	3	.	.803	3	.121
	72 jam PT	.353	3	.	.824	3	.174

a. Hitung Netrofil is constant when Waktu = Kontrol. It has been omitted.

b. Lilliefors Significance Correction



NonParametric Tests - Hitung Neutrofil

Test Statistics[a,b]

	Hitung Netrofil
Chi-Square	14.947
df	6
Asymp. Sig.	.021

a. Kruskal Wallis Test

b. Grouping Variable: Waktu

Mann-Whitney Test

Ranks

	Waktu	N	Mean Rank	Sum of Ranks
Hitung Netrofil	Kontrol	3	2.00	6.00
	3 jam PT	3	5.00	15.00
	Total	6		

Test Statistics[a]

	Hitung Netrofil
Mann-Whitney U	.000
Wilcoxon W	6.000
Z	-2.087
Asymp. Sig. (2-tailed)	.037
Exact Sig. [2*(1-tailed Sig.)]	.100[b]

a. Grouping Variable: Waktu

b. Not corrected for ties.

Ranks

	Waktu	N	Mean Rank	Sum of Ranks
Hitung Netrofil	Kontrol	3	2.00	6.00
	12 jam PT	3	5.00	15.00
	Total	6		

Test Statistics[a]

	Hitung Netrofil
Mann-Whitney U	.000
Wilcoxon W	6.000
Z	-2.087
Asymp. Sig. (2-tailed)	.037
Exact Sig. [2*(1-tailed Sig.)]	.100[b]

a. Grouping Variable: Waktu

b. Not corrected for ties.

Ranks

	Waktu	N	Mean Rank	Sum of Ranks
Hitung Netrofil	Kontrol	3	2.00	6.00
	24 jam PT	3	5.00	15.00
	Total	6		

Test Statistics[a]

	Hitung Netrofil
Mann-Whitney U	.000
Wilcoxon W	6.000
Z	-2.087
Asymp. Sig. (2-tailed)	.037
Exact Sig. [2*(1-tailed Sig.)]	.100[b]

a. Grouping Variable: Waktu

b. Not corrected for ties.

Ranks

	Waktu	N	Mean Rank	Sum of Ranks
Hitung Netrofil	Kontrol	3	2.00	6.00
	48 jam PT	3	5.00	15.00
	Total	6		

Test Statistics[a]

	Hitung Netrofil
Mann-Whitney U	.000
Wilcoxon W	6.000
Z	-2.087
Asymp. Sig. (2-tailed)	.037
Exact Sig. [2*(1-tailed Sig.)]	.100[b]

Ranks

	Waktu	N	Mean Rank	Sum of Ranks
Hitung Netrofil	Kontrol	3	2.00	6.00
	72 jam PT	3	5.00	15.00
	Total	6		

Test Statistics[a]

	Hitung Netrofil
Mann-Whitney U	.000
Wilcoxon W	6.000
Z	-2.087
Asymp. Sig. (2-tailed)	.037
Exact Sig. [2*(1-tailed Sig.)]	.100[b]

a. Grouping Variable: Waktu

b. Not corrected for ties.

Ranks

	Waktu	N	Mean Rank	Sum of Ranks
Hitung Netrofil	1 jam PT	3	2.00	6.00
	12 jam PT	3	5.00	15.00
	Total	6		

Test Statistics[a]

	Hitung Netrofil
Mann-Whitney U	.000
Wilcoxon W	6.000
Z	-1.993
Asymp. Sig. (2-tailed)	.046
Exact Sig. [2*(1-tailed Sig.)]	.100[b]

a. Grouping Variable: Waktu

b. Not corrected for ties.

Ranks

	Waktu	N	Mean Rank	Sum of Ranks
Hitung Netrofil	1 jam PT	3	2.00	6.00
	24 jam PT	3	5.00	15.00
	Total	6		

Test Statistics[a]

	Hitung Netrofil
Mann-Whitney U	.000
Wilcoxon W	6.000
Z	-1.993
Asymp. Sig. (2-tailed)	.046
Exact Sig. [2*(1-tailed Sig.)]	.100[b]

a. Grouping Variable: Waktu

b. Not corrected for ties.

Korelasi Spearman's

Correlations

			Waktu	TNFdarah
Spearman's rho	Waktu	Correlation Coefficient	1.000	-.275
		Sig. (2-tailed)	.	.227
		N	21	21
	TNFdarah	Correlation Coefficient	-.275	1.000
		Sig. (2-tailed)	.227	.
		N	21	28

Correlations

			Waktu	TNFkulit
Spearman's rho	Waktu	Correlation Coefficient	1.000	.295
		Sig. (2-tailed)	.	.194
		N	21	21
	TNFkulit	Correlation Coefficient	.295	1.000
		Sig. (2-tailed)	.194	.
		N	21	28

Correlations

			Waktu	Hitung Netrofil
Spearman's rho	Waktu	Correlation Coefficient	1.000	.570**
		Sig. (2-tailed)	.	.007
		N	21	21
	Hitung Netrofil	Correlation Coefficient	.570**	1.000
		Sig. (2-tailed)	.007	.
		N	21	21

**. Correlation is significant at the 0.01 level (2-tailed).