

DAFTAR PUSTAKA

1. Albarado-Ibañez, A., Elena Arroyo-Carmona, R., Alexandra Bernabé-Sánchez, D., Limón-Cantú, M., López-Silva, B., Lucía Ita-Amador, M. & Torres-Jácome, J. (2020) Heart Rate Variability as Biomarker for Prognostic of Metabolic Disease. In: Autonomic Nervous System Monitoring - Heart Rate Variability. IntechOpen. p. doi:10.5772/intechopen.88766.
2. Ali, A., Majeed, M.B., Saba, K., Bodinarain, A. & Bukhari, M.H. (2013) Effects of different sleeping patterns on academic performance in medical school students. *Natural Science*. 05 (11), 1193–1198. doi:10.4236/ns.2013.511146.
3. Alonazi, O., Alshowkan, A. & Shdaifat, E. (2023) The relationship between psychological resilience and professional quality of life among mental health nurses: a cross-sectional study. *BMC Nursing*. 22 (1). doi:10.1186/s12912-023-01346-1.
4. Alugubelli, N., Abuissa, H. & Roka, A. (2022) Wearable Devices for Remote Monitoring of Heart Rate and Heart Rate Variability—What We Know and What Is Coming. *Sensors*. 22 (22). doi:10.3390/s22228903.
5. Aninditha, T. & Wiratman, W. (2017) BUKU AJAR NEUROLOGI.
6. Bodin, F., McIntyre, K.M., Schwartz, J.E., McKinley, P.S., Cardetti, C., Shapiro, P.A., Gorenstein, E. & Sloan, R.P. (2017) The Association of Cigarette Smoking with High-Frequency Heart Rate Variability: An Ecological Momentary Assessment Study. *Psychosomatic Medicine*. 79 (9), 1045–1050. doi:10.1097/PSY.0000000000000507.
7. Cahyaningrum, E.D. (n.d.) HUBUNGAN AKTIVITAS FISIK DENGAN FUNGSI KOGNITIF LANSIA. 4 (1), 2022.
8. Drucaroff, L.J., Kievit, R., Guinjoan, S.M., Gerschovich, E.R., Cerquetti, D., Leiguarda, R., Cardinali, D.P. & Vigo, D.E. (2011) Higher Autonomic Activation Predicts Better Performance in Iowa Gambling Task. www.cogbehavneurol.com.
9. Ernst, J.R., Grenell, A. & Carlson, S.M. (2022) Associations between executive function and early math and literacy skills in preschool children. *International Journal of Educational Research Open*. 3. doi:10.1016/j.ijedro.2022.100201.

10. Fatissou, J., Oswald, V. & Lalonde, F. (2016) Influence diagram of physiological and environmental factors affecting heart rate variability: An extended literature overview. *Heart International*.11 (1) pp.e32–e40. doi:10.5301/heartint.5000232.
11. Frewen, J., Finucane, C., Savva, G.M., Boyle, G., Coen, R.F. & Kenny, R.A. (2013) Cognitive function is associated with impaired heart rate variability in ageing adults: The Irish longitudinal study on ageing wave one results. *Clinical Autonomic Research*. 23 (6), 313–323. doi:10.1007/s10286-013-0214-x.
12. Gonzalez Kelso, I. & Tadi, P. (2023) Cognitive Assessment. StatPearls Publishing LLC.
13. Grässler, B., Hökelmann, A. & Cabral, R.H. (2020) Resting heart rate variability as a possible marker of cognitive decline. *Kinesiology*.52 (1) pp.72–84. doi:10.26582/k.52.1.9.
14. Gullett, N., Zajkowska, Z., Walsh, A., Harper, R. & Mondelli, V. (2023) Heart rate variability (HRV) as a way to understand associations between the autonomic nervous system (ANS) and affective states: A critical review of the literature. *International Journal of Psychophysiology*.192 pp.35–42. doi:10.1016/j.ijpsycho.2023.08.001.
15. Hussein, A.F., Arun Kumar, N., Burbano-Fernandez, M., Ramirez-Gonzalez, G., Abdulhay, E. & De Albuquerque, V.H.C. (2018) An automated remote cloud-based heart rate variability monitoring system. *IEEE Access*. 6, 77055–77064. doi:10.1109/ACCESS.2018.2831209.
16. Karpyak, V.M., Romanowicz, M., Schmidt, J.E., Lewis, K.A. & Bostwick, J.M. (2014) Characteristics of Heart Rate Variability in Alcohol-Dependent Subjects and Nondependent Chronic Alcohol Users. *Alcoholism: Clinical and Experimental Research*.38 (1) pp.9–26. doi:10.1111/acer.12270.
17. Kiani, S., Black, G.B., Rao, B., Thakkar, N., Massad, C., Patel, A. V, Louis, M., Lu, R., Merchant, F.M., Hoskins, M.H., De Lurgio, D.B., Patel, A.M., Shah, A.D., Leon, A.R., Westerman, S.B., Lloyd, M.S. & El-Chami, M.F. (n.d.) The Safety and Feasibility of Same-Day Discharge After Implantation of MICRA Transcatheter Leadless Pacemaker System Corresponding Author. www.jafib.com.

18. Knight, M.J. & Baune, B.T. (2018a) Cognitive dysfunction in major depressive disorder. *Current Opinion in Psychiatry*.31 (1) pp.26–31. doi:10.1097/YCO.0000000000000378.
19. Knight, M.J. & Baune, B.T. (2018b) Cognitive dysfunction in major depressive disorder. *Current Opinion in Psychiatry*.31 (1) pp.26–31. doi:10.1097/YCO.0000000000000378.
20. Koshimori, Y. & Thaut, M.H. (2018) Future perspectives on neural mechanisms underlying rhythm and music based neurorehabilitation in Parkinson's disease. *Ageing Research Reviews*.47 pp.133–139. doi:10.1016/j.arr.2018.07.001.
21. Kunkle, B.W., Grenier-Boley, B., Sims, R., Bis, J.C., Damotte, V., et al. (2019) Genetic meta-analysis of diagnosed Alzheimer's disease identifies new risk loci and implicates A β , tau, immunity and lipid processing. *Nature Genetics*. 51 (3), 414–430. doi:10.1038/s41588-019-0358-2.
22. Legiran, Azis, M.Z. & Bellinawati, N. (2015) Faktor Risiko Stres dan Perbedaannya pada Mahasiswa Berbagai Angkatan di Fakultas Kedokteran Universitas Muhammadiyah Palembang.
23. Lezak, M.D., Howieson, D.B., Bigler, E.D. & Tranel, D. (2012) *Neuropsychological assessment*, 5th ed. Oxford University Press.
24. McCraty, Rollin. & Institute of HeartMath. (2015) *Science of the heart : exploring the role of the heart in human performance*. HeartMath Research Center, Institute of HeartMath.
25. Nunan D, Sandercock GR, Brodie DA. A quantitative systematic review of normal values for short-term heart rate variability in healthy adults. *Pacing Clin Electrophysiol*. 2010; 33: 1407–1417
26. Parletta, N., Zarnowiecki, D., Cho, J., Wilson, A., Bogomolova, S., Villani, A., Itsiopoulos, C., Niyonsenga, T., Blunden, S., Meyer, B., Segal, L., Baune, B.T. & O'Dea, K. (2019) A Mediterranean-style dietary intervention supplemented with fish oil improves diet quality and mental health in people with depression: A randomized controlled trial (HELFIMED). *Nutritional Neuroscience*. 22 (7), 474–487. doi:10.1080/1028415X.2017.1411320.

27. Perry, S., Khovanova, N.A. & Khovanov, I.A. (2019) Control of heart rate through guided high-rate breathing. *Scientific Reports*. 9 (1). doi:10.1038/s41598-018-38058-5.
28. Popova, P., Rockstroh, B., Miller, G.A., Wienbruch, C., Carolus, A.M. & Popov, T. (2018) The impact of cognitive training on spontaneous gamma oscillations in schizophrenia. *Psychophysiology*. 55 (8). doi:10.1111/psyp.13083.
29. Risdiana, N. & Rozy, M.F. (2019) Hubungan antara Gangguan Pola Tidur dengan Keseimbangan Sistem Saraf Otonom pada Usia Dewasa Muda. *Mutiara Medika: Jurnal Kedokteran dan Kesehatan*. 19 (1). doi:10.18196/mm.190120.
30. Salthouse, T.A. (2019) Trajectories of normal cognitive aging. *Psychology and Aging*. 34 (1), 17–24. doi:10.1037/pag0000288.
31. Sammito, S. & Böckelmann, I. (2016) Factors influencing heart rate variability. *International Cardiovascular Forum Journal*. 6. doi:10.17987/icfj.v6i0.242.
32. Seli, P., Kane, M.J., Metzinger, T., Smallwood, J., Schacter, D.L., Maillet, D., Schooler, J.W. & Smilek, D. (2018) The Family-Resemblances Framework for Mind-Wandering Remains Well Clad. *Trends in Cognitive Sciences*. 22 (11) pp.959–961. doi:10.1016/j.tics.2018.07.007.
33. Shaffer, F. & Ginsberg, J.P. (2017) An Overview of Heart Rate Variability Metrics and Norms. *Frontiers in Public Health*. 5. doi:10.3389/fpubh.2017.00258.
34. Smith, A. (1973) Symbol Digit Modalities Test. APA Psych Test. doi:https://doi.org/10.1037/t27513-000.
35. Suwanvecho, S., Suwanrusme, H., Jirakulaporn, T., Issarachai, S., Taechakraichana, N., et al. (2021) Comparison of an oncology clinical decision-support system's recommendations with actual treatment decisions. *Journal of the American Medical Informatics Association*. 28 (4), 832–838. doi:10.1093/jamia/ocaa334.
36. Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology (1996) Guidelines Heart rate variability Standards of measurement, physiological interpretation, and clinical use.
37. Thayer, J.F. & Lane, R.D. (2000) A model of neurovisceral integration in emotion regulation and dysregulation. *Journal of Affective Disorders*. 61. www.elsevier.com/locate/jad.

38. Tiwari, R., Kumar, R., Malik, S., Raj, T. & Kumar, P. (2021) Analysis of Heart Rate Variability and Implication of Different Factors on Heart Rate Variability. *Current Cardiology Reviews*. 17 (5). doi:10.2174/1573403x16999201231203854.
39. Zeki Al Hazzouri, A., Elfassy, T., Carnethon, M.R., Lloyd-Jones, D.M. & Yaffe, K. (2018) Heart Rate Variability and Cognitive Function in Middle-Age Adults: The Coronary Artery Risk Development in Young Adults. *American Journal of Hypertension*. 31 (1), 27–34. doi:10.1093/ajh/hpx125.

Lampiran 1. Biodata Peneliti

Biodata Penulis

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NIM : C011201230
Tempat, Tanggal Lahir : Makassar, 4 Januari 2001
Jenis Kelamin : Perempuan
Alamat : Jl. Tamalanrea Raya BTP Blok I no. 33, Makassar
No. Telp. : +62 819 4422 2904
Fakultas / Angkatan : Kedokteran / 2020
Email : gitafaidinit@gmail.com
Riwayat Pendidikan :

Jenjang Pendidikan	Nama Sekolah	Tahun
SD	SD Islam Athirah Bukit Baruga	2008 - 2014
SMP	EF Academy Torbay, United Kingdom	2014 - 2017
SMA	EF Academy Torbay, United Kingdom	2017 - 2020
Perguruan Tinggi	Universitas Hasanuddin, Makassar	2020 - sekarang

Lampiran 2. Pengantar Rekomendasi Etik

	KEMENTERIAN PENDIDIKAN KEBUDAYAAN, RISET DAN TEKNOLOGI UNIVERSITAS HASANUDDIN FAKULTAS KEDOKTERAN JL. PERINTIS KEMERDEKAAN KM. 10, MAKASSAR 90245 TELEPON (0411) 586200, (6 SALURAN), 584200, FAX (0411) 585188 Laman: www.unhas.ac.id
Nomor : 01090/UN4.6.8/KP.06.05/2024	18 Januari 2024
Hal : Pengantar Untuk Mendapatkan Rekomendasi Etik	
Yth. Ketua Komisi Etik Penelitian Kesehatan FK Unhas Dengan hormat, disampaikan bahwa mahasiswa Program Studi Sarjana Kedokteran Fakultas Kedokteran Universitas Hasanuddin di bawah ini : N a m a : Gita Fitri Aidini Tammasse N i m : C011201230 bermaksud melakukan penelitian dengan Judul "Hubungan Heart Rate Variability terhadap Fungsi Kognitif pada Mahasiswa Fakultas Kedokteran Universitas Hasanuddin". Untuk maksud tersebut di atas, kami mohon kiranya yang bersangkutan dapat diberikan surat rekomendasi etik dalam rangka penyelesaian studinya. Demikian permohonan kami, atas bantuan dan kerjasamanya disampaikan terima kasih.	
Ketua Program Studi S1 Pendidikan Dokter Fakultas Kedokteran 	
dr. Ririn Nislawati, M.Kes.,Sp.M NIP 198101182009122003	
	

Lampiran 3. Rekomendasi Persetujuan Etik



KEMENTERIAN PENDIDIKAN, KEBUDAYAAN, RISET DAN TEKNOLOGI
UNIVERSITAS HASANUDDIN FAKULTAS KEDOKTERAN
KOMITE ETIK PENELITIAN UNIVERSITAS HASANUDDIN
RSPTN UNIVERSITAS HASANUDDIN
RSUP Dr. WAHIDIN SUDIROHUSODO MAKASSAR
 Sekretariat : Lantai 2 Gedung Laboratorium Terpadu
 JL. PERINTIS KEMERDEKAAN KAMPUS TAMALANREA KM.10 MAKASSAR 90245.
 Contact Person: dr. Agussalim Bukhari, MMed, PhD, SpGK TELP. 081241850858, 0411 5780103, Fax : 0411-581431

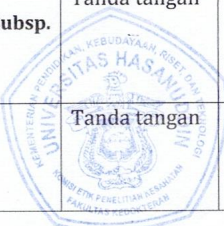


REKOMENDASI PERSETUJUAN ETIK
 Nomor : 56/UN4.6.4.5.31/ PP36/ 2024

Tanggal: 19 Januari 2024

Dengan ini Menyatakan bahwa Protokol dan Dokumen yang Berhubungan Dengan Protokol berikut ini telah mendapatkan Persetujuan Etik :

No Protokol	UH24010042	No Sponsor	
Peneliti Utama	Gita Fitri Aidini Tammasse	Sponsor	
Judul Peneliti	Hubungan Heart Rate Variability terhadap Fungsi Kognitif pada Mahasiswa Fakultas Kedokteran Universitas Hasanuddin		
No Versi Protokol	1	Tanggal Versi	19 Januari 2024
No Versi PSP		Tanggal Versi	
Tempat Penelitian	Fakultas Kedokteran Universitas Hasanuddin Makassar		
Jenis Review	☒ Exempted ☐ Expedited ☐ Fullboard Tanggal	Masa Berlaku 19 Januari 2024 sampai 19 Januari 2025	Frekuensi review lanjutan
Ketua KEP Universitas Hasanuddin	Nama Prof. dr. Muh Nasrum Massi, PhD, SpMK, Subsp. Bakt(K)	Tanda tangan	
Sekretaris KEP Universitas Hasanuddin	Nama dr. Firdaus Hamid, PhD, SpMK(K)	Tanda tangan	



Kewajiban Peneliti Utama:

- Menyerahkan Amandemen Protokol untuk persetujuan sebelum di implementasikan
- Menyerahkan Laporan SAE ke Komisi Etik dalam 24 Jam dan dilengkapi dalam 7 hari dan Laporan SUSAR dalam 72 Jam setelah Peneliti Utama menerima laporan
- Menyerahkan Laporan Kemajuan (progress report) setiap 6 bulan untuk penelitian resiko tinggi dan setiap setahun untuk penelitian resiko rendah
- Menyerahkan laporan akhir setelah Penelitian berakhir
- Melaporkan penyimpangan dari prokol yang disetujui (protocol deviation / violation)
- Mematuhi semua peraturan yang ditentukan

Lampiran 4. SDMT (*Symbol Digit Modalities Test*)

SDMT

(Symbol Digit Modalities Test)

START

INSTRUCTION

Language : English



Desy Kartikasari
Neurology Department
Hasanuddin University
2022

86

Key

◇	□	⊕	≠	➤	⊗	▧	➤	⊗
1	2	3	4	5	6	7	8	9

Test

➤	⊗	⊕	≠	⊗	▧	⊗	□	
▧	➤	⊕	≠	◇	⊗	⊕		

Next

1	2	3
4	5	6
7	8	9

0

Key

➤	◇	≠	▧	⊗	⊕	➤	□	
1	2	3	4	5	6	7	8	9

Test

⊗	◇	▧	➤	□	≠	➤	⊕	

Time Out

Show ScoreBack to Home

Next

1	2	3
4	5	6
7	8	9

0

Key

⊗	□	◇	➤	▧	⊕	➤	≠	⊗
1	2	3	4	5	6	7	8	9

Test

⊗	➤	◇	▧	⊕	⊗	≠	□	

Time Out

Correct Answer : 48

OK

Next

1	2	3
4	5	6
7	8	9

63

Lampiran 5. Data Responden

Kode	SDNN (ms)	LF Power	HF Power	LF/HF Ratio
B1	25.46	351.22	105.19	105.19
B2	49.56	1511.08	1511.08	324.2
B3	53.94	1692.41	1692.41	658.31
B4	24.39	263.11	263.11	126.12
B5	52.42	1630.36	1630.36	652.57
B6	31.43	639.98	639.98	251.25
B7	62.06	3115.9	3115.9	2073.17
B8	58.1	2897.17	2897.17	716.55
B9	77.49	3870.58	3870.58	1031.17
B10	34.37	832.14	832.14	410.79
B11	57.35	725.06	725.06	1684.88
B12	28.3	415.92	415.92	184.18
B13	45.78	1151.31	1151.31	453.51
B14	54.78	2526.72	2526.72	583.53
B15	49.56	1458.76	1458.76	287.8
A1	24.66	230.39	230.39	127.54
A2	55.03	53	1649.06	915.5
A3	17.7	40	158.94	55.9
A4	15.87	37	170.24	17.46
A5	26.37	33	738.16	154.91
A6	52.6	50	1667.36	716.76
A7	52.97	52	2215.12	396.8
A8	48.37	38	1480.46	587.58
A9	14.44	33	166.06	19.16
A10	12.77	39	61.7	34.79
A11	37.29	42	768.67	243.04
A12	27.43	40	468.5	104.28
A13	24.77	31	304.6	45.9
A14	27.69	41	413.94	104.63
A15	26.99	39	619.64	237.13