PERBEDAAN KADAR *TUMOR NECROSIS FACTOR-ALPHA* (TNF-α) PASCA INDUKSI BERBAGAI MODEL STRES *SLEEP DEPRIVATION* PADA TIKUS PUTIH (*Rattus norvegicus*) JANTAN

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ABSTRAK

Latar Belakang: *Sleep deprivation* (SD) dapat memodulasi produksi berbagai sitokin dalam tubuh diantaranya yaitu sitokin pro-inflamasi TNF-α melalui mekanisme hipotalamus-hipofisis-adrenal dan aktivasi sistem saraf simpatis. *Sleep deprivation* dikaitkan dengan meningkatnya risiko penyakit inflamasi dan berkontribusi pada tingginya angka mortalitas. *Sleep deprivation* dapat dipulihkan dengan *sleep recovery* (SR) yang dinilai dapat mengembalikan keseimbangan normal molekul sitokin pada sirkulasi.
Tujuan: Mengetahui perbedaan kadar *Tumor Necrosis Factor-α* (TNF-α) pada tikus putih (*Rattus norvegicus*) jantan pasca induksi berbagai model stres *sleep deprivation.*
Metode: Penelitian ini merupakan penelitian eksperimental dengan *post-test only with control group design.* Penelitian dilakukan pada 25 ekor tikus putih (*Rattus norvegicus)* jantan galur Wistar yang dibagi secara acak menjadi 5 kelompok percobaan yaitu kontrol, PSD (20 jam SD/hari selama 5 hari), TSD (24 jam SD/hari selama 5 hari), PSD+SR (20 jam SD/hari selama 5 hari dilanjutkan SR selama 5 hari), dan TSD+SR (24 jam SD/hari selama 5 hari dilanjutkan SR selama 5 hari). Pengukuran kadar TNF-α menggunakan *Multiplex Bead-based Immunoassays* dengan teknologi Luminex yang dibandingkan kadarnya dengan kelompok kontrol menggunakan *fold change.*
Hasil: Uji *One-way* ANOVA menunjukkan adanya perbedaan yang tidak signifikan kadar TNF-α antar kelompok hewan coba (p=0,399). Peningkatan kadar TNF-α paling tinggi terdapat pada kelompok TSD yaitu 1,37-*fold.* Rerata kadar TNF-α tertinggi yaitu pada kelompok TSD (14,17±8,17 pg/ml).
Kesimpulan: Tidak terdapat perbedaan signifikan kadar sitokin pro-inflamasi inflamasi TNF-α pada tikus putih (*Rattus* norvegicus) jantan pasca induksi berbagai model stres *sleep deprivation.*.

Kata kunci: inflamasi, sitokin, *sleep deprivation, sleep recovery,* TNF-α

THE DIFFERENCE OF TUMOR NECROSIS FACTOR-ALPHA (TNF-α) LEVEL IN MALE ALBINO RATS (Rattus norvegicus) AFTER INDUCTION OF VARIOUS STRESS MODELS OF SLEEP DEPRIVATION

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ABSTRACT

Introduction: *Sleep deprivation (SD) can modulate the production of various cytokines in the body including TNF-α through the hypothalamic-pituitary-adrenal mechanism and activation of the sympathetic nervous system. Sleep deprivation is associated with an increased risk of inflammatory disease and contributes to high mortality rates. Sleep deprivation can be restored by sleep recovery (SR) which is considered to be able to restore the normal balance of cytokine molecules in the circulation.*
Objective: *To determines the differences in the levels of Tumor Necrosis Factor-Alpha (TNF-α) in male albino rats (Rattus norvegicus) after induction various stress models of sleep deprivation.*
Methods: *This study used a true experimental method with posttest only and control group design. Thirty male albino rats were distributed into 5 groups consist of control group, PSD (20 hours of SD/day for 5 days), TSD (24 hours of SD/days for 5 days), PSD+SR (20 hours SD/days for 5 days then SR for 5 days), dan TSD+SR (24 hours SD/days for 5 days then SR for 5 days). Measurement of TNF-α levels using Multiplex Bead-based Immunoassays with Luminex technology, which levels were compared with the control group using fold change.*
Results: *One-way ANOVA test showed there was an insignificant difference in TNF-α levels (p=0.399). The increase in TNF-α levels was highest in the TSD group, which was 1.37-fold. The highest mean level of TNF-α was in the TSD group (14.17±8.17 pg/ml).*
Conclusions: *There was no significant difference in levels of the pro-inflammatory cytokine TNF-α in male albino rats (Rattus norvegicus) after induction various stress models of sleep deprivation.*

Key Words*: cytokines, inflammation, sleep deprivation (SD), sleep recovery (SR), tumor necrosis factor-alpha (TNF-α)*