THE DIFFERENCES OF SUPEROXIDE DISMUTASE (SOD) LEVEL IN MALE ALBINO RATS (*Rattus norvegicus)* AFTER INDUCTION OF VARIOUS STRESS MODELS OF SLEEP DEPRIVATION

ABSTRACT

Sleep deprivation (SD) causes stress in which triggers the production of oxidative stress by decreasing the amount of antioxidant levels or by overexpression of antioxidants that may cause negative effects against oxidative stress. Sleep recovery (SR) could recover the balance between antioxidant, free radical, and reactive oxygen species by reducing stress on mitochondria due to sleep deprivation. The objective of the research is to find out the differences of superoxide dismutase (SOD) level in male albino rats after induction of various stress models of sleep deprivation. This research was an analytical experiment 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) group, TSD (24 hours of SD/ day for 5 days) group, PSD+SR (20 hours of SD/ day for 5 days then SR for 7 days) group, and TSD+SR (24 hours of SD/ day for 5 days then SR for 7 days) group. The highest mean of SOD level was found in TSD group (82.70±12.93 U/mL), followed by PSD group (68.92±19.08 U/mL), PSD+SR group (62.20±11,27 U/mL), control group (53.35±5.77 U/mL), and TSD+SR group (52.69±9.34 U/mL). One-way ANOVA test showed a significant difference ($p<0.05$) of SOD mean levels between groups. Post-hoc Tukey showed significant differences in control group between group TSD ($p=0.011$) and between group TSD and TSD+SR ($p=0.009$). The result of the research showed significant differences of SOD mean level in male albino rats after induction of various stress models of sleep deprivation and after the induction of sleep recovery.

Keywords : Sleep Deprivation (SR),Paradoxical Sleep Deprivation (PSD), Total Sleep Deprivation (TSD), Sleep Recovery, Superoxide Dismutase (SOD)

PERBEDAAN KADAR SUPEROXIDE DISMUTASE TIKUS PUTIH (Rattus norvegicus) JANTAN PASCA INDUKSI BERBAGAI MODEL STRES SLEEP DEPRIVATION

ABSTRAK

Sleep deprivation (SD) dapat menyebabkan stres yanbg berakibat pada produksi stres oksidatif dengan menurunkan kadar antioksidan dalam tubuh atau ekspresi berlebihan dari prooksidan yang menyebabkan munculnya reaksi berlawanan yang memperburuk stres oksidatif. *Sleep recovery* (SR) dapat memperbaiki keseimbangan antioksidan dan radikal bebas termasuk reactive oxygen species (ROS) dengan mengurangi beban mitokondria akibat *sleep deprivation.* Tujuan penelitian ini adalah untuk mengetahui perbedaan kadar superoxide dismutase (SOD) tikus putih (*Rattus norvegicus*) jantan pasca induksi berbagai model stres *sleep deprivation*. Penelitian ini merupakan penelitian analisis eksperimental dengan *posttest only and control group design*. Hewan coba berjumalh 30 tikus dibagi ke dalam 5 kelompok yang terdiri dari kelompok kontrol, kelompok PSD (20 jam SD/ hari selama 5 hari), TSD (20 jam SD/ hari selama 5 hari), kelompok PSD+SR (20 jam SD/ hari selama 5 hari dilanjutkan SR selama 7 hari) group, dan kelompok TSD+SR (24 jam SD/ hari selama 5 hari dilanjutkan SR selama 7 hari). Nilai rerata tertinggi ditemukan pada kelompok TSD (82.70±12.93 U/mL), diikuti oleh kelompok PSD (68.92±19.08 U/mL), kelompok PSD+SR (62.20±11,27 U/mL), kelompok kontrol (53.35±5.77 U/mL), dan kelompok TSD+SR(52.69±9.34 U/mL). Uji *One-way* ANOVA menunjukkan adanya perbedaan signifikan ($p<0.05$) nilai rerata SOD antar kelompok hewan coba. Uji *Post-hoc Tukey* menunjukkan adanya perbedaan signifikan pada kelompok kontrol dan kelompok TSD ($p=0.011$) dan juga pada kelompok TSD dengan TSD+SR ($p=0.009$). Penelitian ini menunjukkan adanya perbedaan signifikan nilai rerata SOD tikus putih (*Rattus norvegicus*) jantan pasca induksi berbagai model stres *sleep deprivation* dan setelah induksi perlakuan *sleep recovery.*

Keywords : *Sleep Deprivation (SR), Paradoxical Sleep Deprivation* (PSD), *Total Sleep Deprivation* (TSD), *Sleep Recovery* (SR), *Superoxide Dismutase* (SOD)