ABSTRACT

Gangguan bekerja seperti beban, resiko dan jam kerja yang berlebihan dapat memicu stres dan mengganggu aksis hipotalamus-hipofisis-adrenal (HHA) sehingga menurunkan fungsi sistem reproduksi pria. Pajanan stres lingkungan kerja baik fisik maupun psikologis seringkali rumit dipisahkan. Pada hewan coba, analogi bentuk stres kerja berupa kurang tidur dilakukan dengan tes *paradoxical sleep deprivation (PSD*) sebagai bentuk stressor fisik dan psikologis, pola sedentarian di kantor dengan tes imobilisas sebagai bentuk stressor social, fisik dan psikologis, dan bekerja pada tempat yang beresiko tinggi dengan tes *footshock* sebagai bentuk stressor fisik. Indikator respon stres pada hewan coba adalah kadar glukokortikoid, dan ersama *gonadotrophin inhibiting hormone* (GnIH) menghambat aksis hipotalamus-hipofisis-testis (HHT) dan memerlukan kajian lebih lanjut pengaruhnya pada organ target yaitu testis.

Penelitian menggunakan rancangan acak lengkap (RAL) dengan metode eksperimental *post test only with control group design* pada tikus putih (*Rattus norvegicus*) jantan galur Wistar berjumlah 24 ekor usia 3-4 bulan, berat badan 200-300 gram. Perlakuan selama selama 25 hari umtuk menghasilkan efek kronik dengan pembagian perlakuan, kelompok I (kontrol, dibiarkan bebas dalam kandang dan pola tidur yang normal), kelompok II (perlakuan model stres PSD menggunakan *modified multiple platform method,* 18 jam sehari pukul 04.00-22.00), kelompok III (perlakuan model stres imobilisasi menggunakan silinder transparan ukuran panjang 21 cm diameter 6 cm, 1 jam sehari pukul 09.00-10.00), kelompok IV (perlakuan model stres *footshock* menggunakan kotak akrilik ukuran 14x25x28 cm dengan dasar dialiri listrik, disengat dengan intensitas 5 mA selama 0,1 detik, 1 jam sehari masing-masing 4-6 kali renjatan pukul 09.00-10.00). Parameter yang diperiksa adalah berat badan berat dan massa testis, kadar testosteron serum, MDA testis, jumlah sel Leydig, sel spermatogenik dan sel Sertoli, jumlah caspase-3, apoptosis sel Leydig dan jumlah sel CA3 hipokampus.

Hasil pemeriksaan menunjukkan terdapat perbedaan rerata berat badan , massa testis, sel Leydig, skor spermatogenesis, caspase-3, apoptosis sel Leydig antara kelompok kontrol dengan semua perlakuan dengan pengaruh yang paling merugikan pada perlakuan PSD. Jumlah sel Leydig, skor spermatogenesis dan MDA testis terdapat perbedaan yang signifikan antara perlakuan PSD dengan perlakuan footshock dan imobilisasi. Pada kadar testosteron dan skor spermatogenesis terdapat perbedaan yang signifikan antara perlakuan PSD dan *footshock* dan pada jumlah sel leydiog terdapat perbedaan yang signifikan antara perlakuan imobilisasi dan *footshock*, dengan jumlah rerata paling sedikit pada kelompok PSD. Pada rerata jumlah sel piramidal CA3 hipokampus terdapat perbedaan yang signifikan antara kontrol dengan kelompok imobilisasi dengan jumlah paling sedikit pada kelompok perlakuan imobilisasi.

Kesimpulan penelitian adalah fungsi reproduksi tikus putih jantan dipengaruhi oleh semua perlakuan stress dengan pengaruh yang paling merugikan adalah

perlakuan PSD, kecuali pada massa testis dan jumlah CA3 hipokampus yaitu stres imobilisasi.

Kata kunci : ***fungsi reproduksi, model stress, tikus putih jantan***

ABSTRACT

Work disturbaces as excessive workload, risk and shitwork can made stress dan inhibited hypothalamic-pituitary-adrenal (HPA) axis so could deecresed male reproductive function system. The effects of stress in workplace as physical or pyschological form often hardly separated . Stress in experimental animals, as a workplace models, paradoxical sleep deprivation (PSD) which represents the physical and psychological stress in the form of sleep deprivation, immobilization representing physical stress, psychological and sosial which form sedentarian pattern, whereas footshock stress is a reflection of the physical stress. Stress respons in experimental animal was glucocorticoid, with *inhibiting hormone* (GnIH) inhibited hypotalamic-pituitary-testis (HPT) axis and need to research further to the effect to testis as target organ.

The method used in the study is experimental post-test only with control group design using a completely randomized design (CRD) in 24 white male rat (*Rattus norvegicus*) strain Wistar, 3-4 month ages and 200-300 grams weight. Experimental animals are divided into 4 treatment groups, including controls (K1) : rats are left free in the cage and normal sleep patterns , stress model of paradoxical sleep deprivation / PSD (K2) : rats treated using the modified multiple platform method (MMPD) are put mice in the tank measuring 123 x 44 x 44 cm of water as high as 1 cm above the surface and there are 14 platforms with 10 cm distance between the platforms, muscle atonia tools switched automatically every 10 minutes to make dormant mice fell into the water and re- awakened and carried out for 18 hours from 04.00-22.00, the mice returned to cages and allowed to sleep for 6 hours from 22.00-04.00.[7] K3 group is immobilization stress by placing rats in a transparent cylinder with a length of 21 cm diameter 6 cm for 1 hours / day . K4 group is footshock stress model, which is placed on the acrylic box size 14 x 25 x 28 cm with basic electricity, stung by the intensity of 5 mA for 0.1 sec for 1 hour / day , 4-6 times each shock with the changing of interval every 5 minutes to avoid rats anticipation. All treatments were given at 09.00 am every day for 25 days to produce chronic stress. Variabels was evaluated were body weight, testis mass, the number Leydic cell, Sertoli cells, spermatogenic cells, caspase3, Leydig cell apoptotic, hypothalamic CA3 cells and the level serum testosterone and testis MDA.

Results showed there was a significant difference in eight body, testis mass, Leydig cells, spermatogenic cells, caspase-3, Leydig cells apoptotic between control and all treatment with the harmful effect was PSD. There was a significant difference in the number of Leydig cells, spermatogenic cells and testis MDA level between PSD and footshock and immobilization stress. There was a significant difference in serum testosterone level and in the number of spermatogenic cells between PSD and *footshock* stress. There was a significant difference in the number of Leydig cells between immobilization and *footshock* stress. In the number of hipothalamic CA3 cells, there was a significant difference between control with with the decreased number was immobilization stress.

The conclusion was the reproductive function of white rat was affected by all treatments and the best effect was PSD, except testis mass and the number of hippocampus CA3 cells was immobilization stress.

Keywords : reproductive fuction, stress models, white male rats