

Analisis Peran Kortisol, Corticotropin Releasing-Factor, Melatonin, Heart Rate Variability dan Quantitative-EEG pada Peningkatan Skor Perceived Stress Scale Perawat Shift Usia Reproduksi = Analysis of the Role of Cortisol, Corticotropin-Releasing Factor, Melatonin, Heart Rate Variability and Quantitative- EEG in Increasing the Perceived Stress Scale Score of Reproductive Age Shift Nurse

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Abstrak

Latar belakang : Perawat memiliki tingkat stres cukup tinggi terpajan risiko psikososial, termasuk bekerja dengan jadwal kerja shift. Selama ini deteksi kasus stres berdasarkan kuesioner yang validitas dan reliabilitasnya cukup baik, seperti antara lain kuesioner PSS. Penelitian bertujuan menguji markah biologi sebagai penanda stres pada perawat shift.

Metode : Penelitian dilakukan Desember 2019 sampai Juni 2020, pada perawat shift dan non-shift, masing-masing 40 orang, dari RSCM, dengan mengambil data secara consecutive sampling. Pemeriksaan kortisol, melatonin dan CRF masing-masing dua kali, yaitu pada kelompok shift sebelum bekerja (=pre) pada pukul 24.00 pada hari jaga terakhir (malam kedua), kemudian pasca bekerja (=post) pukul 08.00 keesokannya. Pada non-shift pada hari kerja pukul 08.00 (=pre) dan 16.00 (=post). Pengukuran HRV dilakukan dua kali dan Q-EEG satu kali pada saat lepas jaga (untuk shift) dan saat bekerja (untuk non-shift).

Hasil : Perawat usia reproduktif yang bekerja shift dan memiliki tingkat stres sedang-berat lebih banyak jumlahnya daripada jumlah perawat yang bekerja non-shift dan memiliki tingkat stres-berat sedang (30% vs 25%). Terdapat perbedaan bermakna rerata kadar kortisol shift= $87,9 \pm 79,1$ ng/ml dan non-shift= $128,8 \pm 51,4$ ng/ml pra kerja ($p < 0,001$), rerata kadar kortisol shift= $139,8 \pm 77,7$ ng/ml dan non-shift= $86,4 \pm 51,8$ ng/ml pasca kerja ($p = 0,001$); rerata kadar melatonin shift= $51,5 \pm 41,2$ ng/ml dan non-shift= $17,1 \pm 20,5$ ng/ml pra kerja ($p < 0,001$), serta rerata kadar melatonin shift= $24,3 \pm 21,2$ ng/ml dan non-shift= $10,8 \pm 7,8$ ng/ml pasca kerja ($p < 0,001$). Terdapat rerata kadar melatonin= $10,8 \pm 7,8$ pg/ml (2,15-38,30) pukul 16.00 dan rerata kadar melatonin= $51,5 \pm 41,2$ pg/ml (0,8-135) pukul 24.00. Rerata kadar CRF= $19,8 \pm 4,9$ pg/ml (10,20-36,06) pukul 08.00, rerata kadar CRF= $17,8 \pm 5,3$ pg/ml (8,08-32,20) pukul 16.00 dan rerata kadar CRF= $18,0 \pm 6,8$ pg/ml (7,69-30,59) pukul 24.00. Komponen HRV SDNN cenderung shift= $38,1 \pm 11,6$ ms > non-shift= $34,2 \pm 10,7$ ms; RMSSD cenderung shift= $31,4 \pm 11,9$ ms > non-shift= $28,7 \pm 12,6$ ms, dan rasio LF/HF cenderung shift= $1,2 \pm 1,6$ < non-shift= $1,8 \pm 1,3$. Q-EEG non-shift kecenderungan peningkatan menonjol di sekitar 10Hz area gelombang Alpha (8-13Hz), yang menunjukkan kondisi dewasa normal terjaga dan tenang; non-shift kecenderungan peningkatan pada area gelombang Beta (14-30Hz) dan Gama (> 30Hz). Uji multivariat Mantel-Haenszel peran bermakna markah biologi (kortisol, CRF, melatonin) terhadap skor PSS secara parsial maupun secara simultan; didapat dari kategori perubahan ketiga markah biologi terhadap stres berdasarkan kategori skor PSS.

Simpulan: Perawat shift berpeluang mengalami stres sedang-berat dibandingkan perawat non-shift. Rerata

kadar kortisol dan melatonin lebih tinggi pasca dibandingkan pre kerja. Gelombang Beta dan Gama cenderung lebih tinggi pada shift dibandingkan non-shift dan berpotensi sebagai predictor stres akibat kerja shift. Kortisol, CRF dan melatonin secara bersama-sama dapat digunakan sebagai markah biologi stres berdasarkan perubahan dari waktu ke waktu

.....Background: A nurse has a high enough stress level because it is directly related to psychosocial hazards on shift work schedules. The Indonesian National Nurses Association stated that the prevalence of stress for nurses reached 50.9%. So far, the detection of stress cases is based on a questionnaire whose validity and relativity are quite good, such as the Perceived Stress Score (PSS) questionnaire. This study aimed to examine biological markers of stress among shift nurses.

Method: The study was conducted at the FKUI Integrated Laboratory, "Laboratorium Kesehatan Daerah DKI", RSCM Intermediate Polyclinic, RSCM Neurology Clinic and Medical Technology IMERI, from December 2019 to March 2020. Respondents came from the shift and non-shift nurses from RSCM, chosen by consecutive sampling. The study involved 40 people individuals in each group. Cortisol, melatonin and CRF were measured twice each, in the shift workgroup (=pre) at 12.00 am on the last watch day (second night), then during post-work, (= post,) at 08.00 am the following day. In the non-shift group blood samples were taken on weekdays at 08.00 am (= pre) and 04.00 pm (=post). HRV measurements were taken twice and Q-EEG once during off-duty (for shift workers) and at work (for non-shift workers).

Results: The percentage of nurses who showed moderate stress levels in the shift group (30%) is higher compared to the non-shift group (25%). There were significant differences between the mean of shift group cortisol= $87,9 \pm 79,1$ ng/ml and non-shift group cortisol= $128,8 \pm 51,4$ ng/ml in pre-work ($p < 0,001$), the mean of shift group cortisol= $139,8 \pm 77,7$ ng/ml and non-shift group cortisol= $86,4 \pm 51,8$ ng/ml in post-work ($p = 0,001$), the mean of shift group melatonin= $51,5 \pm 41,2$ ng/ml and non shift group melatonin= $17,1 \pm 20,5$ ng/ml ($p < 0,001$) in the pre-work, and the mean of shift group melatonin= $24,3 \pm 21,2$ ng/ml and non-shift group melatonin= $10,8 \pm 7,8$ ng/ml in post-work ($p < 0,001$). Melatonin levels mean= $10,8 \pm 7,8$ pg / ml (2.15-38.30) at 04.00 pm and $51,5 \pm 41,2$ pg / ml (0.8-135) at 12.00 pm. CRF levels mean = $19,8 \pm 4,9$ pg / ml (10,2-36,1) at 08.00 am, $17,8 \pm 5,3$ pg/ml (8,08-32.20) at 04.00 pm and $18,0 \pm 6,8$ pg / ml (7.69-30.59) at 12.00 pm. In the HRV component, SDNN mean were higher in the shift group= $38,1 \pm 11,6$ ms than non-shift group= $34,2 \pm 10,7$ ms, higher RMSSD mean on shift group= $31,4 \pm 11,9$ ms than non-shift group= $28,7 \pm 12,6$ ms, and LF/HF ratio mean on shift group= $1,2 \pm 1,6$ compared to non-shift group= $1,8 \pm 1,3$. The brain wave image found a tendency of quite prominent increase around 10 Hz in the non-shift group, namely the frequency area Alpha waves (8-13 Hz), which indicate a normal adult state of wakefulness and calm. Brain waves in the shift group tended to increase in the Beta (14-30 Hz) and Gamma (> 30 Hz) wave areas. With the Mantel-Haenszel multivariate test, there is a significant role of biological markers (cortisol, CRF, melatonin) on the PSS score partially or simultaneously. This role is obtained from the category of changes in the three biological markers to stress based on the PSS score category.

Conclusion: Nurses working shift are more likely to experience moderate-severe stress than non-shift nurses. The mean levels of cortisol are higher and melatonin is also higher after work than before work. Beta and Gama waves tend to be higher in the shift group than in non-shift groups, potentially as predictors of stress due to shift work. Cortisol, CRF and melatonin can be used together as biological markers of stress

based on changes over time.