

ABSTRACT

Background: The increased activity of domestic and international flights at the Adisucipto airport can make noise threshold value (NTV) of the area in Tegaltirto village, Sleman, Yogyakarta I. D. increases. Measurements were carried out in the village tegaltirto showed results that were above the safe bastes NTV which has been determined by the Ministry of Health of the Republic of Indonesia. Increased NTV rated capable of causing health disorders and neuroendocrine physiological changes. Aircraft noise as a psychological stressor is capable of inducing an integrated stress response in the body of people around the airport. Epinephrine is a hormone that plays a role in the integrated mental stress response and capable of causing activation of the sympathetic nervous system. Epinephrine will increase the strength and speed of contraction of the heart and lead to generalized vasoconstriction thereby affecting the cardiovascular response of the people living around airports.

Methods: This study using analytic observational design with cross sectional approach (cross-sectional). This study divided the research subject into two group, the group that was not exposed to airplane noise (low intensity noise) with groups exposed to noise due to the activity of the airplane in airport Adisucipto (high intensity noise). The number of each group is 30 subject and fullfill the inclusion and exclusion criteria. There are two variables in this study, namely: blood pressure response and noisy. Blood pressure response is the reactivity value measured by calculating the difference between the pre-test and post-test of the mental stress test. Blood pressure was measured with a non-invasive method using digital sphygmomanometer. The data obtained then processed statistically using the program SPSS version 15.0 for Windows evaluation only. Data hypotheses were tested using the Mann-Whitney method when the data is considered were not normal distributed according the Kolmogorov-Smirnov method, and using independent-t test when data were normally distributed.

Result: Mann-Whitney test results on the value of systolic reactivity (delta) indicates the value of high noise intensity group (22.68 ± 9.35 mmHg) was significantly higher ($p < 0.05$). Pre-test diastolic blood pressure high noise intensity group (82.77 ± 13.91 mmHg) were not significantly ($p > 0.05$) had higher scores than the low noise intensity group (80.34 ± 11.38 mmHg). Post-test diastolic pressure value high noise intensity group (94.67 ± 15.3 mmHg) after mental stress test were significantly ($p < 0.05$) higher than the low noise intensity group (88.8 ± 8.4 mmHg). Mann-Whitney test results on the value of diastolic reactivity (delta) indicates the value of the high noise intensity group (11.9 ± 5.86 mmHg) was significantly higher ($p < 0.05$). Another aspect of cardiovascular responses were found to undergo significant change ($p < 0.05$) against the mental stress test is the value of reactivity (delta) mean arterial pressure and pulse rate.

Conclusion: There were significant differences ($p < 0.05$) in the value of the blood pressure response (delta) cardiovascular research samples noisy aspects of systolic pressure, diastolic, mean arterial pressure, and pulse rate.

Keywords: noise, blood pressure, cardiovascular reactivity, mental stress test

INTISARI

Latar Belakang: Meningkatnya aktivitas penerbangan domestik dan internasional pada Bandar udara Adisucipto dapat membuat nilai ambang bising(NAB) daerah di Kelurahan Tegaltirto, Sleman, D. I. Yogyakarta meningkat. Pengukuran bising yang dilakukan di kelurahan tegaltirto menunjukkan hasil yang berada diatas bastes aman NAB yang telah ditetapkan oleh Kementerian Kesehatan Republik Indonesia. Peningkatan NAB dinilai mampu menimbulkan gangguan kesehatan dan perubahan fisiologis neuroendokrin. Bising pesawat sebagai stressor psikis mampu menginduksi respon stress terpadu pada tubuh masyarakat sekitar bandara. Epinefrin merupakan salah satu hormone yang berperan dalam respon stress terpadu dan mampu menimbulkan aktivasi system syaraf simpatis. Epinefrin akan meningkatkan kekuatan dan kecepatan kontraksi jantung serta mengakibatkan vasokonstriksi generalisata sehingga mempengaruhi respon kardiovaskular masyarakat yang tinggal di sekitar Bandar udara.

Metode: Observasional dengan pendekatan *cross sectional* (potong lintang). Penelitian ini membagi subjek perempuan penelitian menjadi dua kelompok yaitu kelompok yang tidak terpajan bising mesin pesawat (bising intensitas rendah) dengan kelompok yang terpajan bising mesin pesawat akibat aktivitas bandar udara Adisucipto (bising intensitas tinggi). Tiap kelompok terdiri dari 30 subjek penelitian yang telah disesuaikan dengan kriteria inklusi dan eksklusi. Terdapat dua variabel pada penelitian ini, yaitu: Respon tekanan darah dan bising. Respon tekanan darah adalah Nilai reaktivitas yang diukur dengan menghitung selisih nilai post-test dan pre-test terhadap mental stress test. Tekanan darah diukur dengan metode non-invasive menggunakan sphygmomanometer digital. Data yang didapatkan kemudian diolah secara statistik menggunakan program *SPSS ver 15.0 for windows evaluation only*. Data diuji hipotesis menggunakan metode *Mann-Whitney* bila distribusi data dianggap tidak normal menggunakan metode *Kolmogorov-Smirnov*, dan menggunakan metode *independent-t test* bila distribusi data normal. Hipotesis dianggap signifikan bila menghasilkan nilai $p < 0,05$.

Hasil: Hasil uji *mann-whitney* pada nilai reaktivitas sistolik (delta) menunjukkan nilai kelompok bising intensitas tinggi ($22,68 \pm 9,35$ mmHg) lebih tinggi secara bermakna ($p < 0,05$). Tekanan diastolik pre-test kelompok bising intensitas tinggi ($82,77 \pm 13,91$ mmHg) tidak memiliki perbedaan nilai yang bermakna ($p > 0,05$) dibandingkan dengan kelompok bising intensitas rendah ($80,34 \pm 11,38$ mmHg). Pada nilai tekanan diastolik post-test kelompok bising intensitas tinggi ($94,67 \pm 15,3$ mmHg) setelah melakukan *mental stress test* lebih tinggi dibandingkan kelompok bising intensitas rendah ($88,8 \pm 8,4$ mmHg) secara bermakna ($p < 0,05$). Hasil uji *mann-whitney* pada nilai reaktivitas sistolik (delta) menunjukkan nilai kelompok bising intensitas tinggi ($11,9 \pm 5,86$ mmHg) lebih tinggi secara bermakna ($p < 0,05$). Aspek respon kardiovaskuler lain yang ditemukan mengalami perubahan yang bermakna ($p < 0,05$) terhadap *mental stress test* adalah nilai reaktivitas(delta) *mean arterial pressure* dan frekuensi nadi.

Kesimpulan: Terdapat perbedaan yang bermakna ($p < 0,05$) pada nilai respon tekanan darah(delta) kardiovaskular sampel penelitian bising dari aspek tekanan sistolik, diastolik, *mean arterial pressure*, dan frekuensi nadi.

Kata kunci: Bising, tekanan darah, reaktivitas kardiovaskuler, *Mental Stress Test*