

## Hubungan kadar hemoglobin dan beberapa faktor lain terhadap waktu sadar efektif di kalangan calon dan awak pesawat militer pada simulasi ketinggian 25000 kaki = Correlation between haemoglobin and other risk factors to time of useful consciousness among candidates and military aircrew in 25000 feet altitude simulation

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### Abstrak

[Latar belakang : Hipoksia merupakan bahaya potensial dalam penerbangan.

Waktu sadar efektif (WSE) merupakan waktu ketika seorang penerbang atau awak pesawat mulai terpajan hipoksia sampai sebelum mengalami inkapasitasi.

Selama rentang waktu tersebut seorang penerbang dapat membuat keputusan atau tindakan yang tepat. Hemoglobin sangat berpengaruh terhadap saturasi O<sub>2</sub> yang menentukan oksigenasi jaringan tubuh. Penelitian ini bertujuan untuk mengidentifikasi faktor-faktor yang mempengaruhi WSE yaitu pada calon dan awak pesawat militer di Indonesia.

Metode: Desain penelitian dengan potong lintang, pengambilan sampel secara purposif. Data diambil dari hasil pelaksanaan Indoktrinasi Latihan Aerofisiologi (ILA) di Lakespra Saryanto selama Januari-Mei 2014. Subyek penelitian adalah calon dan awak pesawat militer. Lama WSE diperoleh dengan demonstrasi hipoksia dalam ruang udara bertekanan rendah (RUBR) pada simulasi ketinggian 25000 kaki. Nilai kesamaptan jasmani ditentukan dengan VO<sub>2</sub>maks. Analisis regresi linier digunakan untuk mengidentifikasi faktor risiko WSE.

Hasil: Calon dan awak pesawat militer yang melaksanakan ILA sebanyak 183 orang. Duapuluh lima subyek dikeluarkan karena tidak melaksanakan demonstrasi hipoksia di RUBR atau uji latih jantung, 158 subyek memenuhi kriteria inklusi.

Faktor dominan yang memperpanjang WSE adalah Hb, sedangkan yang mempersingkat adalah IMT dan umur. Setiap 1 g/dL Hb menambah WSE 14,7 detik [koefisien regresi ( $\beta$ ) = 14,677 ; p = 0,010]. Kenaikan IMT 1 kg/m<sup>2</sup> mengurangi WSE 3,3 detik [ $\beta$  = -3,274; 95% interval kepercayaan (CI) = -8,287;1,738 ; p = 0,199]. Penambahan umur 1 tahun mengurangi WSE

3,9 detik ( $\beta$  = -3,917; p = 0,000)., Background: Hypoxia is potential hazard in aviation. Time of useful consciousness (TUC) is time during when a pilot or aircrew exposed hypoxia before experiencing incapacitation. During the span of time, a pilot can make the right decision or action. Haemoglobin (Hb) influences the oxygen saturation that determines oxygenation of the body tissue. This study aims to identify the factors affect WSE on candidates and military aircrew in Indonesia.

Methods: Study designed was cross sectional with purposive sampling. Data taken from the result of Indoktrinasi Latihan Aerofisiologi (ILA) in Lakespra Saryanto Jakarta during January to May 2014. Research subjects were candidates

and military aircrews. Time of useful consciousness was obtained from hypoxia demonstration in hypobaric Chambers at 25000 feet altitude simulation. The value of physical fitness was determined by VO<sub>2</sub>max. Linear regression analysis was used to identify risk factors of TUC.

Results: Candidates and military aircrew carried out the ILA were 183 persons. Twenty-five subjects were excluded because of not carried out hypoxia demonstration in hypobaric chamber or treadmill test. The dominant factors that extend TUC were Hb, while shortening were BMI and age. Each 1 g/dL Hb extend TUC 14.7 seconds [regression coefficient ( $\beta$ ) = 14.677 ; p = 0.010]. Increasing BMI of 1 kg/m<sup>2</sup> shorten TUC 3.3 seconds [ $\beta$  = -3.274; 95% confidence interval (CI) = -8.287;1.738 ; p = 0.199]. Addition of age 1 year shorten TUC 3.3 seconds ( $\beta$  = -3.917 ; p = 0.000).

Conclusion: Increasing Hb extends TUC, while gain BMI and addition age shorten TUC.]