

The correlation between oxidative stress marker malondialdehyde and blood pressure in elderly people = Korelasi antara marka oksidatif stres malondialdehid dan tekanan darah pada lansia

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Abstrak

Latar Belakang: Seiring bertambahnya usia penduduk, penyakit kronis, khususnya hipertensi, semakin banyak terjadi di Indonesia. Aterosklerosis yang ditandai dengan penyempitan lumen pembuluh darah akibat plak lemak merupakan salah satu penyebab hipertensi. Proses stres oksidatif ini menghasilkan molekul yang dikenal sebagai malondialdehid (MDA) yang dapat diukur. Oleh karena itu, tujuan utama penelitian ini adalah untuk mengetahui hubungan antara tekanan darah dan kadar malondialdehid.

Metode: Sebanyak 90 lisat darah dari penelitian sebelumnya digunakan. Kadar malondialdehid diukur dengan menggunakan metode TBARS, dimana reaksinya menghasilkan warna merah-ungu. Intensitas pewarnaan ini sesuai dengan seberapa banyak MDA bereaksi dengan reagen. Untuk mengukurnya, spektrofotometer digunakan. Data tersebut kemudian dimasukkan ke dalam persamaan regresi sebelum dianalisis menggunakan uji non parametrik Kendall-Tau b.

Hasil: Konsentrasi MDA yang sangat tinggi ditemukan pada partisipan dengan 3 penyakit kronis (4,194 nmol/ml). Penyimpangan signifikan dari normalitas ditemukan ($p < 0,05$). Tes awal kami tidak menunjukkan hasil yang signifikan: sistolik ($\beta = -0.036$, $p = 0.637$), diastolik ($\beta = -0.071$, $p = 0.376$), dan MAP ($\beta = -0.060$, $p = 0.422$). Namun, analisis subkelompok pada populasi lansia “middle-old” menunjukkan hubungan positif sedang antara kadar MDA dan tekanan darah sistolik ($\beta = 0.308$, $n = 25$, $p = 0.043$).

Kesimpulan:

192);"><o:p></o:p></p><p class="NormalIntro" style="margin: 0cm; text-align: justify; line-height: 18.4px; font-size: 12pt; font-family: "Times New Roman", serif; color: rgb(0, 0, 0);">Korelasi antara kadar MDA dan tekanan darah ditemukan. Namun, perlu diketahui karena sifat hipertensi yang kompleks, banyak faktor yang juga bisa bertanggung jawab atas tingginya konsentrasi MDA.</p><hr /><p class="NormalIntro" style="margin: 0cm; text-align: justify; line-height: 18.4px; font-size: 12pt; font-family: "Times New Roman", serif; color: rgb(0, 0, 0);">Introduction</p><p class="NormalIntro" style="margin: 0cm; text-align: justify; line-height: 18.4px; font-size: 12pt; font-family: "Times New Roman", serif; color: rgb(0, 0, 0);">As the population ages, chronic diseases, particularly hypertension, are becoming prevalent in Indonesia. Atherosclerosis, characterized by the narrowing of blood vessel lumens due to fatty plaques, is one of the causes of hypertension. This process of oxidative stress produces a molecule known as malondialdehyde (MDA), which can be quantified. Therefore, the primary objective of this research is to investigate the correlation between hypertension and the levels of malondialdehyde.</p><p class="NormalIntro" style="margin: 0cm; text-align: justify; line-height: 18.4px; font-size: 12pt; font-family: "Times New Roman", serif; color: rgb(0, 0, 0);">Method</p><p class="NormalIntro" style="margin: 0cm; text-align: justify; line-height: 18.4px; font-size: 12pt; font-family: "Times New Roman", serif; color: rgb(0, 0, 0);">A total of 90 RBC lysate from previous research were used. Malondialdehyde levels were assessed using the TBARS method, which led to a red-purple coloration. The intensity of this coloration corresponds to the extent of MDA's reaction with the reagent. To quantify this, a spectrophotometer was utilized. The data then was incorporated into a regression equation before being analyzed using the Kendall-Tau b non-parametric test.</p><p class="NormalIntro" style="margin: 0cm; text-align: justify; line-height: 18.4px; font-size: 12pt; font-family: "Times New Roman", serif; color: rgb(0, 0, 0);">Results</p><p class="NormalIntro" style="margin: 0cm; text-align: justify; line-height: 18.4px; font-size: 12pt; font-family: "Times New Roman", serif; color: rgb(0, 0, 0);">A notably high MDA concentration was found in participants with 3 chronic diseases (4.194 nmol/ml). A significant deviation from normality were observed ($p < 0.05$). Our initial test did not reveal any significant results: systolic ($r = -0.036$, $p = 0.637$), diastolic ($r = -0.071$, $p = 0.376$), and MAP ($r = -0.060$, $p = 0.422$). However, subgroup analysis in middle-old population revealed moderate positive relationship between MDA levels and systolic blood pressure ($r = 0.308$, $n = 25$, $p = 0.043$).</p><p class="NormalIntro" style="margin: 0cm; text-align: justify; line-height: 18.4px; font-size: 12pt; font-family: "Times New Roman", serif; color: rgb(0, 0, 0);">Conclusion</p><p class="NormalIntro" style="margin: 0cm; text-align: justify; line-height: 18.4px; font-size: 12pt; font-family: "Times New Roman", serif; color: rgb(0, 0, 0);">There is indeed a correlation between MDA levels and blood pressure. However, it should be noted due complex nature of hypertension, many factors could also be responsible for high MDA concentration.</p>