Implikasi asam amino esensial pada kadar mTORC1, S6K1, dan 4EBP1 anak stunting di beberapa wilayah Provinsi Sumatera Selatan = Implications of essential amino acids on mTORC1, S6K1, and 4EBP1 levels in stunted children in several areas of South Sumatra Province

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Abstrak

Latar belakang: Indonesia dihadapkan pada masalah stunting yang cukup tinggi. Anak yang menderita stunting memiliki konsentrasi asam amino esensial yang lebih rendah. Mechanistic Target of Rapamycin Complex 1 (mTORC1) sebagai jalur utama regulasi pertumbuhan yang sensitif terhadap asam amino, mempromosikan sintesis protein melalui S6K1 dan 4EBP1. Penelitian ini bertujuan menganalisis keterlibatan asam amino esensial pada kadar mTORC1, S6K1, dan 4EBP1 dan korelasinya dengan kejadian stunting. Metode: Desain penelitian adalah kasus-kontrol. Anak berusia 6-24 bulan di Provinsi Sumatera Selatan diambil secara cluster random sampling berjumlah 137 orang. Pengumpulan data menggunakan kuesioner dan pengukuran antropometri. Pemeriksaan feses secara makroskopis dan mikroskopis, pemeriksaan darah dengan teknik LC-MS dan ELISA. Hasil: Terdapat perbedaan bermakna dalam hal usia anak, panjang badan lahir, BB/U, dan LK/U. Tidak ditemukan perbedaan makroskopis dan mikroskopis feses di antara kedua kelompok. Asam amino triptofan berbeda bermakna (p=0,004) dan berhubungan dengan kejadian stunting (p=0,045). Kadar mTORC1 dengan S6K1 dan 4EBP1 tidak berbeda pada kedua kelompok. Kadar mTORC1 tidak berhubungan dengan kejadian stunting. Kadar asam amino lisin berhubungan bermakna dengan kadar mTORC1 (p=0,003). Kadar mTORC1 berhubungan bermakna dengan kadar S6K1 dan 4EBP1 (masing-masing p<0,001). Simpulan: Asam amino esensial berimplikasi pada kejadian stunting dan kadar mTORC1, mTORC1 memengaruhi kadar S6K1 dan 4EBP1 anak.
.....Background: Indonesia is faced with a fairly high stunting problem. Children who suffer from stunting have lower concentrations of essential amino acids. The Mechanistic Target of Rapamycin Complex 1 (mTORC1) as the main pathway of growth regulation that is sensitive to amino acids, promotes protein synthesis through S6K1 and 4EBP1. This study aims to analyze the involvement of essential amino acids in mTORC1, S6K1, and 4EBP1 levels and their correlation with stunting. Methods: The study design was a case-control study. Children aged 6-24 months in South Sumatra Province were taken using cluster random sampling totaling 137 people. Data collection used questionnaires and anthropometric measurements. Macroscopic and microscopic examination of feces, and blood examination using LC-MS and ELISA techniques. Results: Significant differences were in child age, birth length, BB/A, and LK/A. There were no macroscopic and microscopic differences in feces between the two groups. Tryptophan amino acids were significantly different (p=0.004) and associated with stunting (p=0.045). mTORC1 levels with S6K1 and 4EBP1 were not different in both groups. mTORC1 levels were not associated with stunting. Lysine amino acid levels were significantly associated with mTORC1 levels (p=0.003). mTORC1 levels were significantly associated with S6K1 and 4EBP1 levels (each p<0.001). Conclusion: Essential amino acids are implicated in stunting and mTORC1 levels, and mTORC1 affects children's S6K1 and 4EBP1 levels.