Faktor Genetik dan Nutrisi Terhadap Height-for-Age Zscore pada Anak Sekolah Dasar di Kabupaten Malang, Jawa Timur: Fokus pada Polimorfisme Gen VDR rs11568820 dan rs4516035 = Genetic and Nutritional Factors Related to Height-for-Age Z-score among Elementary School Children in Malang District, East Java: Focus on VDR Gene Polymorphism rs11568820 and rs4516035

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Abstrak

Kejadian stunting pada masa anak-anak masih menjadi masalah kesehatan masyarakat, khususnya di negara berkembang seperti Indonesia. Berdasarkan data Riset Kesehatan Dasar (Riskesdas, 2013) prevalensi stunting pada anak usia 5-12 di Indonesia sebesar 30,7%. Faktor nutrisi telah diketahui sebagai penyebab kejadian stunting. Namun, beberapa penelitian menemukan adanya kontribusi genetik terhadap penyerapan kalsium yang akan mempengaruhi pertumbuhan, yaitu gen vitamin D receptor (VDR). Tujuan dari penelitian ini adalah untuk mengetahui hubungan antara faktor genetik dan nutrisi terhadap height-for-age Z-core (HAZ) pada anak sekolah dasar di kabupaten Malang, Jawa Timur. Penelitian ini menggunakan desain studi potong lintang dan dilakukan pada tahun 2018. Penelitian ini melibatkan 142 anak sekolah dasar berusia 8-10 tahun. Pengukuran tinggi badan dilakukan untuk menghitung HAZ pada anak-anak. Asupan energi, protein, kalsium dan vitamin D diperoleh dengan 24-hour dietary recall selama 4 hari. Dua SNP yang terletak pada daerah promoter dari gen VDR dipilih (rs11568820 dan rs4516035); dan distribusi genotipnya dianalisis menggunakan Real Time PCR. Faktor lain seperti karakteristik sosiodemografi, riwayat penyakit menular dan skor paparan sinar matahari diperoleh dengan kuesioner terstruktur, dan kuesioner paparan sinar matahari. Hasil penelitian menunjukkan bahwa prevalensi stunting sebesar 21,8%. Asupan makan sebagian besar kurang terpenuhi, khususnya asupan kalsium dan vitamin D. Distribusi genotip rs11568820 adalah TT (19%), CT (43,7%) dan CC (37,3%). Sedangkan distribusi genotip rs4516035 adalah TT (90,8%) dan CT (9,2%). Analisis bivariat menunjukkan adanya korelasi yang signifikan antara asupan energi dan protein terhadap HAZ (p=0,030 dan p=0,016), tetapi tidak pada asupan kalsium dan vitamin D. Selain itu, tidak ditemukan hubungan yang signifikan antara polimorfisme kedua SNP gen VDR dengan HAZ (p>0,05). Setelah disesuaikan dengan faktor-faktor lainnya, asupan protein secara signifikan berkolerasi dengan HAZ (Î²=0,034, 95% CI 0,016 – 0,053, p<0,001, adj. R2=0,077). Efek dari aktivitas gen VDR kemungkinan tidak terlihat karena rendahnya asupan vitamin D yang diperlukan untuk meningkatkan penyerapan kalsium yang kemudian akan mempengaruhi HAZ.

.....Childhood stunting remains as a major public health problem, especially in developing countries such as Indonesia. According to Indonesia Basic Health Research (Riskesdas, 2013) the prevalence of stunting among children aged 5-12 years old in Indonesia was 30.7%. Nutrition factors has been known as a predominant factors associated with stunting. However, some studies discovered a genetic contribution in calcium absorption that will affect growth of the children, known as vitamin D receptor (VDR) gene. The aim of this present study was to assess the association between genetic and nutritional factors related to height-forage Z-score (HAZ) of elementary school children in Malang District, East Java. The study design was a cross-sectional study which began on 2018. In this study, 142 children aged 8-10 years old were

included. Height measurement was obtained to calculate HAZ of the children. Dietary intake consist of energy, protein, calcium and vitamin D intake were obtained using 4 days 24-hour dietary recall. Two SNPs located in the promoter region of VDR gene were selected (rs11568820 and rs4516035); its genotype distribution were analyzed using Real Time PCR system. Other factors such as sociodemographic characteristics, history of infectious diseases and sun exposure score were assessed using structured questionnaire and sun exposure questionnaire. The result showed that the prevalence of stunting was 21.8%. Dietary intake were mostly inadequate, especially for calcium and vitamin D intake. Genotype distribution of rs11568820 was TT (19%), CT (43.7%), and CC (37.3). While for rs4516035 the distribution was TT (90.8%) and CT (9.2%). Bivariate analysis showed a significant correlation between energy and protein intake with HAZ of the children (p=0.030 and p=0.016, respectively), but not with calcium and vitamin D intakes. There were no significant association between VDR gene polymorphism for both SNPs and HAZ of the children (p>0.05). Adjusted by other factors, protein intake was significantly correlated with HAZ (Î²=0.034, 95% CI 0.016 – 0.053, p<0.001, adj. R2=0.077). The effect of VDR gene promoter activity might not revealed due to very low vitamin D intake to stimulates intestinal calcium absorption which in turn affect HAZ.</p>