ABSTRAK

Pertumbuhan seorang anak merupakan proses interaksi faktor genetik, endokrin, nutrisi, dan lingkungan. Seorang anak dikatakan memiliki perawakan pendek bila panjang/tinggi badan menurut usia dibawah -2 SD kurva WHO *Child Growth Standards 2006* (WHOCGS 2006). Seorang anak bertambah tinggi badannya melalui proses osifikasi endokondral jaringan kartilago di ujung lempeng pertumbuhan yang dipengaruhi oleh kadar IGF-1, TSH, FT4, vitamin 25(OH)D, kalsium, fosfor, dan magnesium. Penelitian ini bertujuan mengetahui perbedaan kadar IGF-1, TSH, FT4, Vitamin 25(OH)D, kalsium (Ca), fosfor (Ph), dan magnesium (Mg) antara perawakan pendek *underweight*, perawakan pendek berat badan (BB) normal dan perawakan normal BB normal serta mengetahui asosiasi kadar IGF-1, TSH, FT4, vitamin 25(OH)D, Ca, Ph, dan Mg dengan kejadian perawakan pendek anak usia 24−59 bulan.

Penelitian analitik potong lintang menggunakan data registri dan BBT 225 anak (84 perawakan pendek *underweight*, 70 perawakan pendek BB normal, 71 perawakan normal BB normal berdasarkan kurva WHOCGS 2006) berusia 24−59 bulan bertempat tinggal di Kabupaten Bandung selama periode Mei−Agustus 2021. BBT disimpan pada suhu -80 ^{o}C. Uji statistik t-*student*, *chi*-kuadrat, Mann Whitney, Kruskal Walis, ANOVA, analisis regresi linier berganda, dan analisis regresi logistik dipakai untuk melihat perbandingan karakteristik dasar, perbedaan kadar IGF-1, TSH, FT4, vitamin 25(OH)D, Ca, Ph, dan Mg antar kelompok serta asosiasinya dengan kejadian perawakan pendek pada anak usia 24−59 bulan.

Pada penelitian ini, didapatkan kadar IGF-1, TSH, FT4, Ca, Ph, dan Mg bermakna lebih rendah pada anak perawakan pendek *underweight* dibanding dengan perawakan pendek BB normal dan perawakan normal BB normal (semua nilai $P<0,05$). Uji regresi linier berganda dengan mengendalikan variabel perancu menunjukkan selisih bermakna rerata kadar IGF-1, TSH, FT4, vitamin 25(OH)D, Ca, Ph, dan Mg perawakan pendek *underweight* lebih rendah dibanding dengan perawakan normal BB normal secara berturut-turut 40,406 ng/mL; 0,329 µIU/mL, 0,175 ng/dL; 2,131 ng/mL; 0,320 mg/dL; 0,794 mg/dL; dan 0,086 mg/dL (semua nilai $P<0,05$). Kadarnya tidak berbeda bermakna antara perawakan pendek BB normal dan perawakan normal BB normal (semua nilai $P\geq0,05$). Terdapat asosiasi kadar IGF-1, FT4, Ca, Ph, dan Mg dengan kejadian perawakan pendek anak usia 24−59 bulan dengan uji regresi logistik (semua nilai $P<0,05$).

Disimpulkan bahwa kadar IGF-1, TSH, FT4, Vitamin 25(OH)D, Ca, Ph, dan Mg lebih rendah pada perawakan pendek *underweight* dibanding dengan perawakan pendek BB normal dan perawakan normal BB normal dan terdapat asosiasi kadar IGF-1, FT4, Ca, Ph, dan Mg dengan kejadian perawakan pendek anak usia 24−59 bulan.

Kata kunci: Anak, fosfor, FT4, IGF-1, kalsium, magnesium, perawakan pendek, TSH, *underweight*, vitamin 25(OH)D.

ABSTRACT

The growth of a child is a process of interaction of genetic, endocrine, nutrition, and environmental factors. A child is considered short stature if his/her height-for-age is below -2 SD of the WHO Child Growth Standards 2006 (WHOCGS 2006). A child's height increases through the process of endochondral ossification at the growth plate, which is influenced by the levels of IGF-1, TSH, FT4, 25(OH) vitamin D, calcium, phosphorus, and magnesium. This study aims to determine the differences in the levels of IGF-1, FT4, vitamin 25(OH)D, calcium (Ca), phosphorus (Ph), and magnesium (Mg) between underweight children with short stature, normal weight children with short stature and children with normal weight and stature and to understand the association between the levels IGF-1, TSH, FT4, 25(OH) vitamin D, Ca, Ph, and Mg with the occurrence of short stature in children aged 24−59 months.

A cross-sectional analytical study used registry data and stored biological sampels (SBS) of 225 children (84 underweight children with short stature, 70 normal weight children with short stature, and 71 children with normal weight and stature based on the WHOCGS 2006) aged 24−59 months residing in the Bandung District, during the period from May to August 2021. SBS were stored at -80°C. Student t-test, chi-square, Mann Whitney, Kruskal-Wallis, ANOVA, multiple linear regression, and logistic regression analysis were used in this research.

In this study: the levels of IGF-1, TSH, FT4, calcium, phosphorus, and magnesium were significantly lower in underweight children with short stature compared to normal weight children with short stature, and normal weight and stature children (all $P<0.05$). Multiple linear regression analysis, controlling for confounding variables, showed significant differences in mean levels of IGF-1, TSH, FT4, 25(OH) vitamin D, Ca, Ph, and Mg between underweight children with short stature and normal weight and stature children, with values of 40,406 ng/mL, 0.329 µIU/mL, 0.175 ng/dL, 2.131 ng/mL, 0.320 mg/dL, 0.794 mg/dL, and 0.086 mg/dL, respectively (all $P<0.05$). There were no significant differences in levels between normal weight children with short stature and normal weight and stature children (all $P\geq0.05$). Logistic regression analysis showed an association between the levels of IGF-1, FT4, Ca, Ph, and Mg with the occurrence of short stature in children aged 24-59 months (all $P<0.05$).

In conclusion, the levels of IGF-1, TSH, FT4, vitamin 25(OH)D, calcium, phosphorus, and magnesium are lower in underweight children with short stature compared to normal weight children with short stature, and normal weight and stature children. There is an association between the levels of IGF-1, FT4, Ca, Ph, and Mg and the occurrence of short stature in children aged 24-59 months.

Keywords: *Calcium, children, FT4, IGF-1, magnesium, phosphorus, short stature, TSH, underweight, 25(OH) vitamin D.*