Korelasi asupan makronutrien dan mikronutrien dengan komposisi tubuh pasien talasemia mayor remaja = Correlation of macronutrient and micronutrient intake with body composition in adolescent thalassemia major patients

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Abstrak

Latar belakang: Kegagalan pertumbuhan sering terjadi pada pasien talasemia mayor (TM). Tata laksana nutrisi merupakan salah satu aspek penting untuk mengoptimalkan hasil luaran klinis. Penilaian komposisi tubuh berupa persentase massa otot, persentase masa lemak dan densitas massa tulang (DMT) menjadi komponen penting dalam mengevaluasi status gizi. Hingga saat ini belum ada penelitian di Indonesia yang mengevaluasi hubungan antara asupan makronutrien dan mikronutrien terhadap komposisi tubuh pada pasien TM remaja serta hubungannya dengan berbagai parameter antropometri. Metode: Penelitian dengan desain studi potong lintang melibatkan 55 pasien TM remaja, berusia 10-18 tahun di Pusat Talasemia RSUPN Cipto Mangunkusumo. Status gizi dievaluasi disertai pengukuran lingkar lengan atas (LILA), triceps skin thicknes (TSK), dan mid-upper arm muscle circumference (MUAMC). Asupan makronutrien dan mikronutrien diperoleh melalui food record selama tiga hari. Persentase massa otot, massa lemak, dan DMT dinilai menggunakan dual-energy X-ray absorptiometry (DXA). Kadar vitamin D diperiksa melalui metode enzyme-linked immunosorbent assay (ELISA). Data dianalisis menggunakan korelasi Pearson dan Spearman sesuai dengan pola distribusi normalitas.
Hasil penelitian: Gizi kurang dijumpai pada 58,2% subjek dan gizi buruk pada 9,1% subjek. Rerata dan median asupan zat gizi harian dibandingkan dengan kebutuhannya pada subyek lelaki yakni asupan energi 85,6 % (SB 20,19), protein 55% (SB 14,19), lemak 112,4% (SB 35,48), karbohidrat 85,5 % (SB 23,31), vitamin D 29% (RIK 15,68-40,80), vitamin E 34,1% (SB 14,77), kalsium 37% (RIK 16,63-43,45), dan asam folat 32,98% (SB 14,6), sedangkan pada subyek perempuan asupan energi 93,6 % (SB 18,61), protein 59% (RIK 51-63), lemak 112,4% (RIK 105-142,5), karbohidrat 93,3 % (SB 25,5), vitamin D 22% (RIK 13,65-43), vitamin E 24% (RIK 21,65-39,7), kalsium 35,7% (RIK 20,45-55,6), dan asam folat 26,3% (RIK 16,2-41,15). Terdapat korelasi ringan antara asupan energi dengan persentase massa lemak pada subyek lelaki dan perempuan (r= 0,25, p= 0,017; r= 0,38, p= 0,02). Tidak terdapat korelasi antara asupan karbohidrat, lemak, dan protein, vitamin D, vitamin E, kalsium, dan asam folat terhadap persentase massa otot, persentase massa lemak dan DMT. Kadar vitamin D tidak berkorelasi dengan komposisi tubuh. Terdapat korelasi kuat antara LILA dan MUAMC dengan persentase massa otot (r= 0,54, p<0,001; r= 0,68, p<0,001) dan massa lemak (r=0,77, p<0,001; r= 0,61, p<0,001).
Kesimpulan: Lebih dari separuh remaja talasemia mengalami malnutrisi dan kekurangan asupan protein. Komposisi tubuh berkorelasi dengan jumlah asupan energi, tetapi tidak dengan yang lainnya. Kadar vitamin D tidak berkorelasi dengan komposisi tubuh. Lingkar lengan atas (LILA) dan MUAMC berkorelasi dengan persentase massa otot dan massa lemak.
.....Background:Growth failure is common in thalassemia major (TM) patients. Nutritional management is an imperative aspect to optimize the clinical outcome. Measurement of muscle mass percentage, fat mass percentage, and bone mass density (BMD) on body composition is important component in assessing the

nutritional status. There has been no study in Indonesia for the correlation between macronutrient and micronutrient intake on body composition in adolescents with thalassemia major.
Methods: This cross-sectional study involved 55 adolescent TM patients aged 10-18 years old taken through concecutive sampling at the Thalassemia Center dr. Cipto Mangunkusumo National Hospital Jakarta. Nutritional status was evaluated and anthropometric measurements was performed including mid-upper arm circumference (MUAC), triceps skin thickness (TSK), and mid-upper arm muscle circumference (MUAMC). Macronutrient and micronutrient intake was obtained through a three-day food record. Muscle mass percentage, fat mass percentage, and BMD were assessed by dual-energy X-ray absorptiometry (DXA). The enzyme-linked immunosorbent assay (ELISA) method was used to examine vitamin D levels. The data was analyzed by Pearson and Spearman correlation depending on the type of distribution.
Result: Moderate malnourish occurred in 58.2% subjects and severe malnourish in 9,1% subjects. The mean and median daily nutrient intake compared to their needs in male subjects were energy intake 85.6% (SD 20.19), protein 55% (SD 14.19), fat 112.4% (SD 35.48), carbohydrates 85.5% (SD 23.31), vitamin D 29% (IQR 15.68-40.80), vitamin E 34.1% (SD 14.77), calcium 37% (IQR 16.63-43, 45), and folic acid 32.98% (SD 14.6), while in female subjects, energy intake were 93.6% (SD 18.61), protein 59% (IQR 51-63), fat 112.4% (IQR 105-142.5), carbohydrates 93.3% (SD 25.5), vitamin D 22% (IQR 13.65-43), vitamin E 24% (IQR 21.65-39.7), calcium 35 .7% (IQR 20.45-55.6), and folic acid 26.3% (IQR 16.2-41.15). There was a mild correlation between energy intake and fat mass percentage in male and female subjects (r= 0,25, p= 0,017; r= 0,38, p= 0,02). There was no correlation between carbohydrate, fat, and proteis, vitamin D, vitamin E, calcium, and folic acid on the proportion of muscle mass percentage, fat mass percentage, and BMD. Vitamin D levels were not correlated with body composition. There were strong correlation between MUAC and MUAMC with the percentage of muscle mass (r= 0.54, p<0.001; r= 0.68, p <0.001) and fat mass (r=0.77, p<0.001; r= 0.61 , p < 0.001).
Conclusion: More than half of adolescent TM patients are malnourished and lack protein intake. Body composition correlates with total calorie intake, but not with anything else. Vitamin D levels are not correlated with body composition. Mid-upper arm circumference and MUAMC correlate with the percentage of muscle mass and fat mass.