Faktor Predisposisi Intrauterin, Ekstrauterin, Stres Oksidatif dan Adaptasi Metabolik serta Risiko Kardiometabolik pada Anak Stunting Usia 6-24 bulan = Intrauterine, Extrauterine Predisposing Factors, Oxidative Stress and Metabolic Adaptation and Cardiometabolic Risk in Stunting Children Aged 6-24 Months

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Abstrak

Latar Belakang : Stunting pada anak usia di bawah dua tahun (U₂) menggambarkan kekurangan nutrisi kronis dengan berbagai faktor predisposisi dan prevalensinya masih tinggi di Indonesia. Kurang nutrisi kronis menyebabkan tubuh berdaptasi pada ukuran dan fungsi organ, yang berdampak meningkatnya risiko kardiometabolik (RKM) kemudian hari. Tujuan penelitian ini membuktikan perbedaan faktor predisposisi intrauterin (FPIntra), ekstrauterin (FPEkstra), stres oksidatif (SO), adaptasi metabolik (AM) dan RKM pada anak stunting (AnS) dan tidak stunting (AnTS) usia 6-24 bulan (U₆₋₂₄).
Metode : Penelitian <em>nested -kohort, <em>cross-sectional komparatif digunakan untuk menilai peran FPIntra, yaitu antropometri ibu sebelum hamil, asupan dan status gizi ibu hamil, berat lahir (BL) dan panjang lahir (PL) subjek, FPEkstra yaitu ASI eksklusif, berat badan (BB) dan panjang badan (PB) enam bulan pertama (U_{6I}), antropometri anak, asupan gizi AnS dan AnTS U₆₋₂₄. Indikator SO yaitu kadar MDA serum. Indikator AM yaitu ekspresi <em>microRNA -148a. Indikator RKM yaitu ukuran lingkar pinggang (LP), kadar kolesterol-LDL, kolesterol-HDL, trigliserida, dan glukosa darah. Semua subjek merupakan peserta TKA, Bogor dan pengambilan data dilakukan sejak bulan Juli 2017 hingga Februari 2018, dilaksanakan di Rumah Kohort TKA, Bogor. Analisis statistik univariat, bivariat dan multivariat digunakan untuk membandingkan kelompok AnS dan AnTS dengan batas kemaknaan p <0,05<em>.
Hasil : Sebanyak 38 AnS dan 46 AnTS U₆₋₂₄memenuhi kriteria penelitian dan didapatkan FPIntra AnS lebih rendah secara bermakna dibanding AnTS, yaitu kategori kadar seng serum ibu hamil, tinggi badan ibu, BL dan PL subjek (p = 0,047, p < 0,001, p = 0,009, p = 0,025). Asupan mangan (p= 0,007), isoleusin (p =0,015), pertambahan BB U_{6-I} (p =0,002), rerata pertambahan BB/bulan U_{6-I} (p =0,002), pertambahan PB U_{6-I} (p <0,001), rerata pertambahan PB/bulan U_{6-I} (p <0,001) dan kadar Hb anak (p =0,005) lebih rendah secara bermakna pada AnS, sementara RDW-CV lebih tinggi pada AnS (p =0,009). Tidak ditemukan perbedaan SO pada kedua kelompok, tetapi gambaran adanya AM pada usia dini terlihat pada normalized expression ratio microRNA -148a AnS sebesar 2,6 kali lebih cepat dibandingkan dengan AnTS, yang mengakibatkan kolesteol-LDL di sirkulasi lebih tinggi pada AnS. Ditemukan dua indikator RKM berbeda bermakna yaitu ukuran LP AnS lebih kecil bermakna, namun kadar trigliseridanya lebih tinggi pada AnS. Kadar kolesterol-LDL cenderung lebih tinggi pada AnS.
Kesimpulan : FPIntra dan FPEkstra terbukti memberikan dampak terhadap kejadian stunting anak U₆₋₂₄. Adaptasi metabolik dan RKM pada AnS sudah terdeteksi pada U₆₋₂₄.
Saran : Penting untuk memantau status gizi ibu sebelum hamil dan memberikan intervensi nutrisi dalam

1000 hari awal kehidupan untuk mengurangi RKM di kemudian hari.
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Background : Stunting children under two years of age (U2) illustrates chronic nutritional deficiency with various predisposing factors and the prevalence is still high in Indonesia. Chronic malnutrition causes the body to adapt organ size and function, which results in increased cardio metabolic risk (CMR) in adulthood The aim of this study was to prove differences in intrauterine predisposition (PFIntra), extra uterine (PFExtra), oxidative stress (OxS), metabolic adaptation (MetAdapt) and CMR in stunting children (StC) and non stunting children (NStC) aged 6-24 months (U6-24).
Methods : A nested-cohort, comparative cross-sectional study was used to assess the role of PFIntra, namely maternal anthropometry before pregnancy, nutrition intake and nutritional status of pregnant women, birth weight (BW) and birth length (BL) of subjects, PFExtra namely exclusive breastfeeding, weight and body length in the first six months (U6I), pediatric anthropometry and nutritional intake in StC and NStC U6- 24. Indicator of OxS was serum MDA level. MetAdapt indicator was microRNA-148a expression. The CMR indicators were waist circumference (WC), LDL-cholesterol levels, HDL-cholesterol, triglycerides, and blood glucose. All subjects were participants in Bogor Longitudinal Study Child Growth and Development (BLSCGD), in Bogor Tengah sub-district. Univariate, bivariate and multivariate statistical analyzes were used to compare StC and NStC groups with significant p value <0.05.
Results : There were 38 StC and 46 NStC U6- 24 fulfilled the study criteria and obtained significantly lower PFIntra in StC compare to NStC, namely the serum zinc level category of pregnant women, maternal height, BW and BL subjects ($p = 0.047$, $p <0.001$, $p = 0.009$, $p = 0.025$). Manganese intake ($p = 0.007$), isoleucine intake ($p = 0.015$), increase in weight U6-I ($p = 0.002$), weight gain per month U6-I ($p = 0.002$), increase in length U6-I ($p <0.001$), length increase per month U6-I ($p <0.001$) and Hb levels of children ($p = 0.005$) were significantly lower in StC, while RDW-CV was higher in StC ($p = 0.009$). There were no significant differences in OxS between two groups, but MetAdapt at an early age was seen in the StC as show in normalized expression ratio of microRNA-148a was 2.6 times faster than NStC, which resulted in higher circulation of LDL in StC. Two of five CMR indicators were significantly different, namely the size of WC in StC was significantly smaller, but the triglyceride level was higher in StC. LDL-cholesterol levels tend to be higher in StC.
Conclusion : PFIntra and PFExtra proved to have an impact on the incidence of stunting children U6- 24. Metabolic adaptation and CMR in StC have been detected in U6- 24.
Suggestion: It is important to monitor the nutritional status of the mother before pregnant and provide nutritional interventions within the first 1000 days of life to reduce cardio metabolic risk in the future.