

Peran Isolat Protein Soya Terhadap Tumbuh Kembang Anak Alergi Susu Sapi

dr. Fadilah Mutaqin, Sp.A,
MBiomed

FK-UB/RSUD dr. Saiful Anwar
Malang

Deklarasi

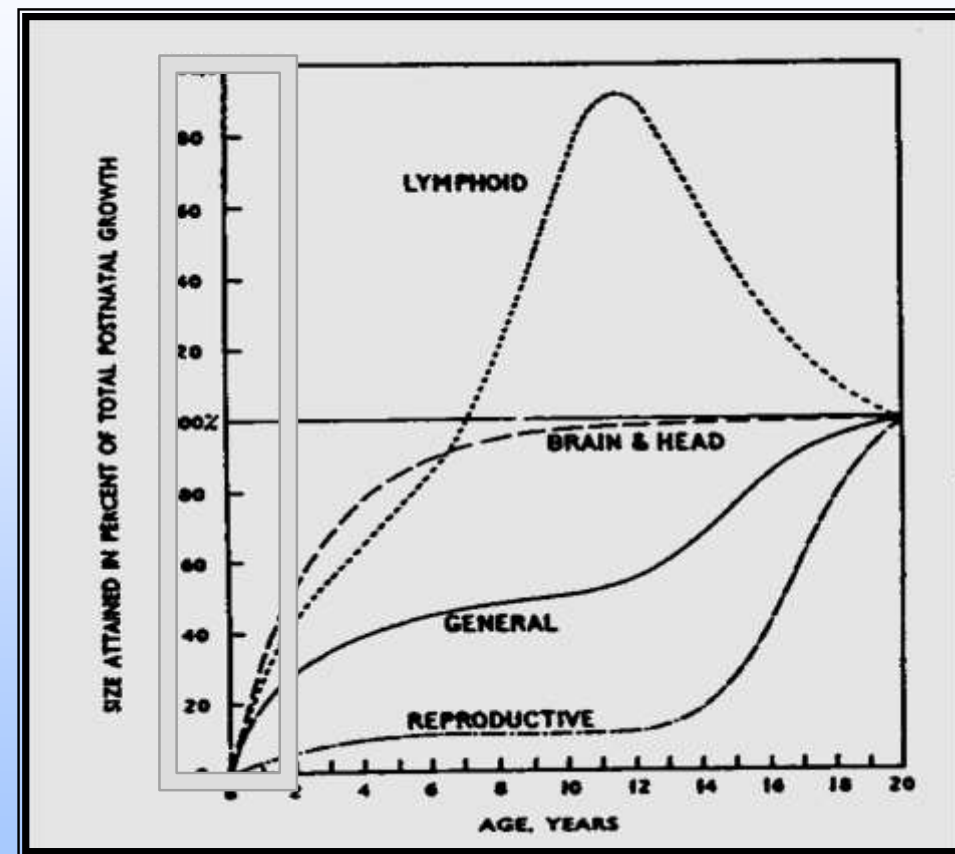
Tidak ada konflik kepentingan dalam presentasi ini

TUMBUH KEMBANG



Pertumbuhan

1. Pertumbuhan adalah bertambahnya ukuran- ukuran tubuh, baik fisik(anatomi) maupun struktural dalam arti sebagian atau keseluruhan.
2. Perubahan ukuran (BB, PB, LK) dan proporsi tubuh
3. Kecepatan pertumbuhan tidak teratur → ada percepatan dan perlambatan
4. Masa pertumbuhan tercepat: dalam kandungan, bayi, pubertas

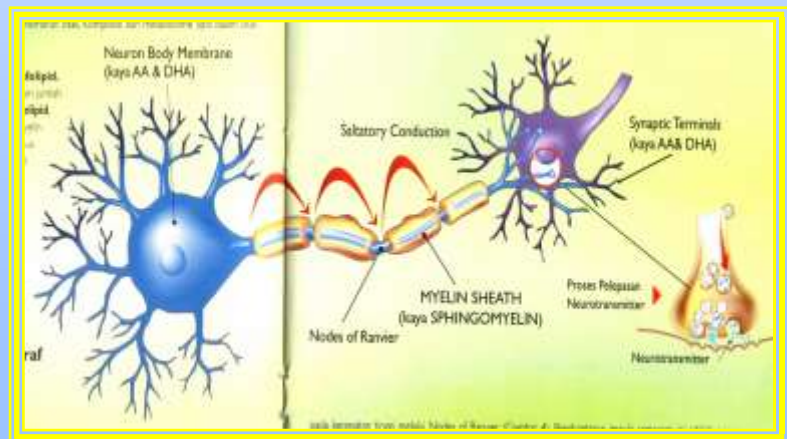


Perkembangan

- Bertambahnya ketrampilan, kemampuan
 - Gerak kasar
 - Gerak halus
 - Bahasa dan komunikasi
 - Kemandirian, personal sosial

3 mekanisme seluler perkembangan otak

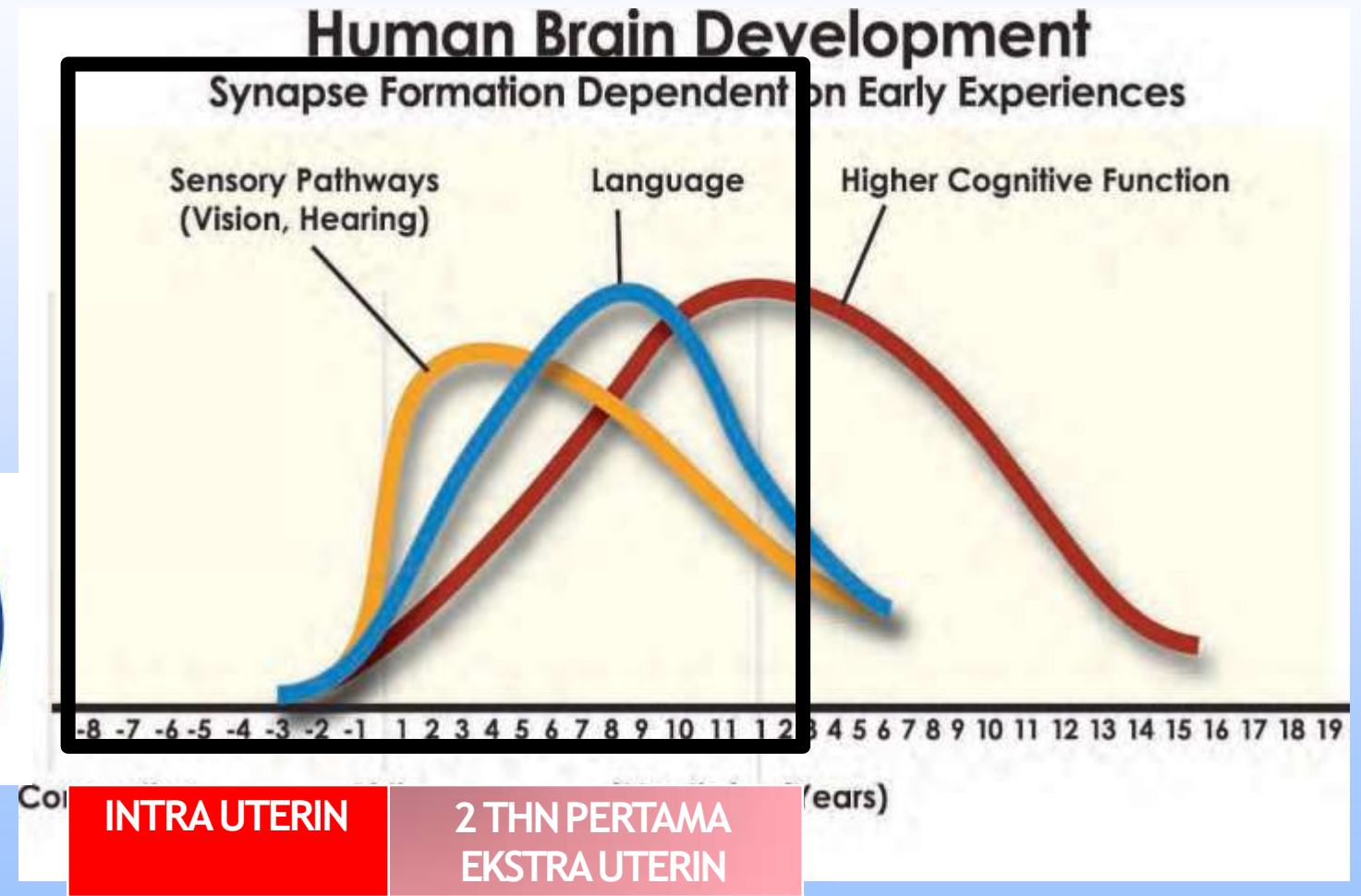
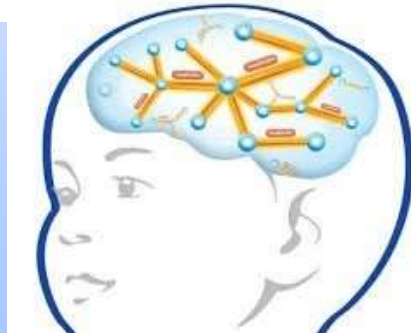
- Neurogenesis/ cell death
- Synaptogenesis/ pruning → experiences/ stimulasi
- Myelination → nutrisi



1000 HPK: masa sensitive dan periode emas pertumbuhan dan perkembangan

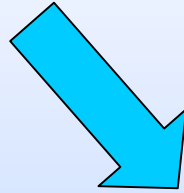


Masa kritis pertumbuhan perkembangan OTAK



FAKTOR YANG MEMPENGARUHI TUMBUH KEMBANG

STIMULASI



GENETIK



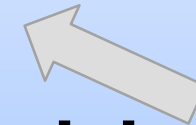
NUTRISI



LINGKUNGAN



penyakit



Alergi



5 elemen penting pengasuhan anak

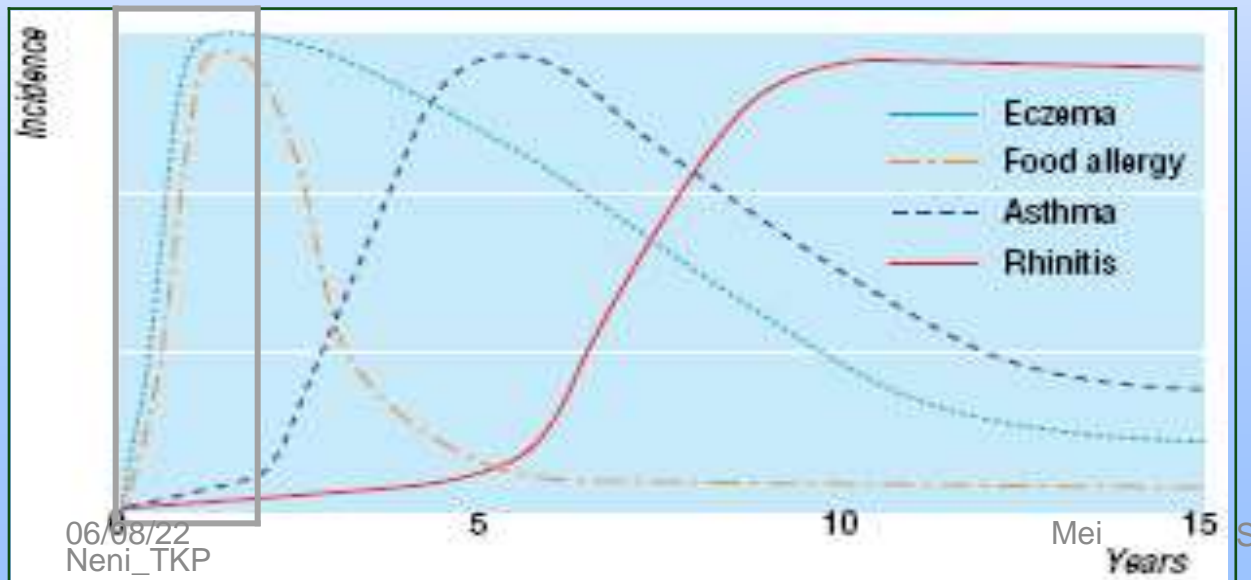
- Menjaga kesehatan
- Pemberian nutrisi yang adekuat
- Stimulasi/ pembelajaran usia dini
- Pencegahan bahaya dan kekerasan
- Pengasuhan responsive, kasih sayang, religius



Alergi dan dampak pada pertumbuhan dan perkembangan

Alergi makanan

- Prevalensi 3.6% to 10%
- Alergi susu sapi (Cow's milk allergy)
 - Self-report: 1.2%–17%, SPT alone: 0.2%–2.5%, sIgE alone: 2%–9%, Symptoms and sensitization: 0%–2.0%, Food challenge: 0%–3.0% Rona R.J., et.al., The prevalence of food allergy: A meta-analysis. *J.Allergy Clin. Immunol.* 2007;120:638–646. doi: 10.1016/j.jaci.2007.05.026
- Merupakan salah satu penyebab alergi pada usia dini → puncak pertumbuhan dan perkembangan otak --> dampak pada tumbuh kembang anak



Pengaruh alergi terhadap pertumbuhan

International survey on growth indices and impacting factors in children with food allergies

R. Meyer, K. Wright, M. C. Vieira, K. W. Chong, P. Chatchatee, B. J. Vlieg-Boerstra, M. Groetch, G. Dominguez-Ortega, S. Heath, A. Lang, L. Archibald-Durham, R. Rao, R. De Boer, ... See all authors

First published: 09 November 2018 | <https://doi.org/10.1111/jhn.12610>

12 center, UK, US, AS

Conclusions

Stunting is more common in children with food allergies than low weight. Children particularly at risk of poor growth are those with non-IgE and mixed IgE and non-IgE mediated allergies, as well as those with cow's milk allergy.

Asia Pac Allergy. 2018 Oct;8(4):e34. English.

Published online Oct 11, 2018. <https://doi.org/10.5415/apallergy.2018.8.e34>

Copyright © 2018. Asia Pacific Association of Allergy, Asthma and Clinical Immunology.

Growth of children with food allergies in Singapore

Kok Wee Chong, Karen Wright,¹ Anne Goh,¹ Rosan Meyer,² and Rajeshwar Rao¹

¹Allergy Service, Department of Paediatric Medicine, KK Women's and Children's Hospital, Singapore 229899.

²Department of Paediatrics, Imperial College, London, United Kingdom.

Conclusion

This is the first survey documenting growth in children with food allergy in Singapore. Eczema, IgE mediated and mixed type allergies are associated with poorer growth rates in these children. Early individualised nutritional intervention is recommended for all children with food allergy.

Original Article

Reduced Final Height and Inadequate Nutritional Intake in Cow's Milk-Allergic Young Adults

Tali Sinai PhD, RD^a, Michael R. Goldberg MD, PhD^b, Liat Nachshon MD^b, Roni Amitzur-Levy MSc, RD^b, Tamar Yichie MSc, RD^b, Yitzhak Katz MD^b, Efrat Monsonego-Ornan PhD^a, Arnon Elizur MD^{b, c, d, e}

Young adults who have CMA from infancy are at risk of not reaching their growth potential. Growth and nutritional monitoring and appropriate dietary intervention are of particular importance in these at-risk individual.

Mekanisme¹

- Eliminasi makanan → defisiensi mikro dan makronutrien
- Inflamasi kronik Gastrointestinal → malabsorpsi, loss of protein
- Kebutuhan yang meningkat
- Penggunaan kortikosteroid
- Komorbid (asma, dermatitis)

1) Mehta H, Groetch M, Wang J. Growth and nutritional concerns in children with food allergy. *Curr Opin Allergy Clin Immunol*.

2012;12(2):275-279

Pengaruh alergi terhadap perkembangan

Early childhood allergy linked with development of attention deficit hyperactivity disorder and autism spectrum disorder

Shay Nemet ¹, Ilan Asher ¹, Israel Yoles ², Tuvia Baevsky ², Zev Sthoeger ¹

Results: A total of 117 022 allergy and 116 968 non-allergic children. The mean follow-up period was 11 ± 6 years. The presence of allergic disorders in early childhood significantly increased the risk to develop ADHD (O.R 2.45, CI 2.39–2.51; $p < .0001$), ASD (O.R 1.17, CI 1.08–1.27; $p < .0001$), or both ADHD + ASD (O.R 1.5, CI

Conclusion: Allergic disorder in early childhood significantly increased the risk to develop ADHD, and to a lesser extent ASD, in later life.

The underlying mechanism of the association between allergic diseases and psychiatric disorders **remains unclear**. The “orchestration” of the pro-inflammatory cytokines plays an important role in the pathogenesis of allergy-related diseases.

Dampak pada tidur dan kualitas hidup



Allergologia et Immunopathologia
Volume 48, Issue 2, March–April 2020, Pages 158–164



Original Article

Sleep disturbances and affecting factors in young children with food allergy and their mothers ☆

S. Filiz^a, Ş. Keleş^a, U.E. Akbulut^b, İ.A. Işık^b, M.Z. Kara^c

Conclusion:

The presence of a food allergy in a child may be associated with a **deterioration in sleep quality in children and mothers as well as increased depressive symptoms in mothers.**

Gangguan tidur



Pertumbuhan & Perkembangan

Journal of Human Growth and Development

versão impressa ISSN 0104-1282versão On-line ISSN 2175-3598

J. Hum. Growth Dev. vol.31 no.1 Marília jan./abr. 2021

<http://dx.doi.org/10.36311/jhgd.v31.11077>

ORIGINAL ARTICLE

DOI: 10.36311/JHGD.V31.11077

Cow's milk protein allergy, quality of life and parental style

Conclusions: Cow's milk protein allergy had an impact on the health and nutritional status of children, on the corporal stimulation received by the children, and on the quality of emotional life of those guardians.

Dampak Alergi Lebih Dari Sekedar Gejala Yang Dialami Si Kecil

Berdampak pada tumbuh kembang anak dan berisiko mengalami alergi hingga dewasa



Fisik¹⁻⁴



Finansial^{1,7,8}

Adanya peningkatan biaya yang dikeluarkan untuk pengobatan anak alergi

Orang tua mengalami stress, cemas, dan depresi apabila anak alergi. Kualitas hidup anak dan orang tua juga akan terganggu

Psikologis^{1,4,5}



Sosial⁹⁻¹⁰



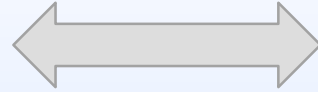
Anak alergi sering kali merasa malu dan menjadi korban ejekan dari temannya

Referensi: 1. Pawankar E et al. WAO. White Book on Allergy. Update 2013: 5-55; 2. Prescott SL. J Allergy Clin Immunol 2013;131(1):23-30. 3. West CE et al. J Allergy Immunol 2015: 135(1):3-13 4. Silverberg JL. J Allergy Clin Immunol 2015. 5. Lozinsky, A.C, et al 2015. Childre,2, 317-329. 6. Sladkevicius E, et al. J Med Econ. 2010 Mar;13(1):119-28. 7. Gupta R et al. JAMA Pediatr 2013;167(11):1026-31. 8. Patel DA et al. J Allergy Clin Immunol 2011;128(1) 110-115e1 9. Shemesh E, et al. Pediatrics 2013. 10. Botteman MF, et al. World Nutr Journal Vol 2, No.2 (2019)

Iron deficiency and allergy—clinical evidence

Alergi

Ibu hamil ADB meningkatkan risiko anak mengalami alergi**



Anemia defisiensi besi

Anak dengan alergi mempunyai risiko 8 x mengalami ADB*

- Retrisksi makanan
- Inflamasi kronis GI, absorpsi

1 dari 3 Anak Indonesia berusia balita berisiko tidak mampu menyerap zat besi secara optimal***



*Rhew K, Oh JM. Association between atopic disease and anemia in pediatrics: a cross-sectional study. BMC Pediatr. 2019;19:455

**Shaheen SO, Macdonald-Wallis C, Lawlor DA, Henderson AJ. Haemoglobin concentrations in pregnancy and respiratory and allergic outcomes in childhood: birth cohort study. Clin Exp Allergy. 2017;47:1615–24

***Bedard A, Lewis SJ, Burgess S, Henderson AJ, Shaheen SO. Maternal iron status during pregnancy and respiratory and atopic outcomes in the offspring: a

Zat Besi Berperan Penting untuk Mendukung Perkembangan Otak dan Pertumbuhan Fisik

Perkembangan Otak

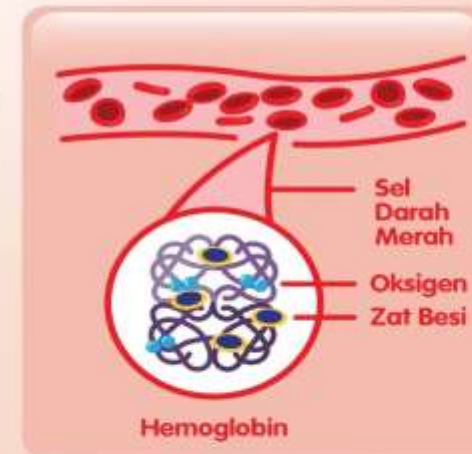
Zat besi memicu pembentukan selaput saraf (mielinisasi) yang membantu proses penerimaan informasi pada otak dan meningkatkan proses belajar



Pertumbuhan Fisik & Energi

Zat besi termasuk komponen pembentuk hemoglobin yang berperan untuk membawa oksigen ke sel-sel tubuh agar

berfungsi optimal, sehingga dapat mendukung anak untuk aktif bereksplorasi dan siap belajar



Reference: 1. Wang B, et al. 2013. Iron therapy for improving psychomotor development and cognitive function in children under the age of three with iron deficiency anaemia. Cochrane Database of Systematic Reviews 2013, Issue 6. Art. No.: CD001444.

2. Fritham SJB. Am Soc Nutr Adv Nutr. 2011; 2 ;112-21; 2. Chevalier N, et al. Plos One 2015; DOI:10.1371/journal.pone.0139897

3. Soliman AT, et al. 2009. Linear Growth in Children with Iron Deficiency Anemia Before and After Treatment. J. Trop. Ped. 2009; 55(5); 324-327

Dampak Alergi Susu Sapi dan Defisiensi Zat Besi jika tidak ditangani dengan baik

Dampak Alergi



Meningkatkan risiko alergi berkelanjutan^{1,2,3}



Meningkatkan risiko penyakit kronis lainnya⁴

Dampak Defisiensi Zat Besi⁵⁻¹¹



Prestasi akademik rendah



Gangguan permanen pada sistem motorik dan sensorik



Mudah terserang penyakit



Pertumbuhan fisik terhambat

Oleh karena itu, penting untuk memastikan nutrisi yang tepat dan adekuat untuk si Kecil dengan alergi susu sapi

Referensi:

1. Wahn U. (1998). Alergische Erkrankungen im Säuglings- und Kindesalter, Chapter 7 ed. E.H. Allergologie, Benz, Roetken. Allergologie, Editors Heppit, Benz, Roetken. Springer-Verlag Berlin Heidelberg New York.
2. Ill, S. et al. (2006). Perennial allergen sensitization early in life and chronic asthma in children: a birth cohort study. *Lancet*. 2006. 368 (9537): p. 765-70.
3. Hamelmann, E., et al. (2008). Primary prevention of allergy: avoiding risk or providing protection *Clin Exp Allergy*, 2008, 38(2): p. 233-45.
4. Prescott, S. (2013). Early-life environmental determinants of allergic diseases and the wider pandemic of inflammatory noncommunicable diseases. *J Allergy Clin Immunol*, 2013. p. 23-30
5. Gwethy et al. *Health SA*. 2019;20(24):1101.
6. Kashy S et al. *Public Health Nutr* 2020;23(1):1896-906.
7. Wieser S et al. *BMC Public Health* 2012;12:1167.
8. Plesner R et al. *PLoS One* 2015; 08:10091.
9. Soliman AT, et al. *Indian J Endocrinol Metab*. 2014;
10. Gutama B, et al. *BMC Hematol*. 2014
11. Jayaweera et al. *Scientific Reports* (Nature Publisher Group) 2019;09(9):1-8

Pastikan Pemenuhan Nutrisi Penting seperti Zat Besi untuk Anak Alergi Susu Sapi

1

Ketahui tingkat kecukupan asupan zat besi pada anak berdasarkan AKG

Age Group	RDA (AKG 2019)
0-15 month	0.3 mg
0-11 month	11 mg
1-3 year	7 mg
4-6 year	10 mg

2

Konsumsi makanan sumber zat besi

Sumber Zat Besi Home

Makanan Sumber Hewani

Lebih mudah diabsorbsi dibanding zat besi non-home
Contohnya: daging merah, hati, ikan, unggas, susu sapi, telur



Sumber Zat Besi Non-Home

Makanan sumber tanaman dan makanan fortifikasi
Kurang dapat diabsorbsi dibanding zat besi home
Contohnya: tanaman polong, kedelai sayur, buah, formula isolat protein soya yang difortifikasi zat besi



Pastikan Pemenuhan Nutrisi Penting seperti Zat Besi untuk Anak Alergi Susu Sapi

3

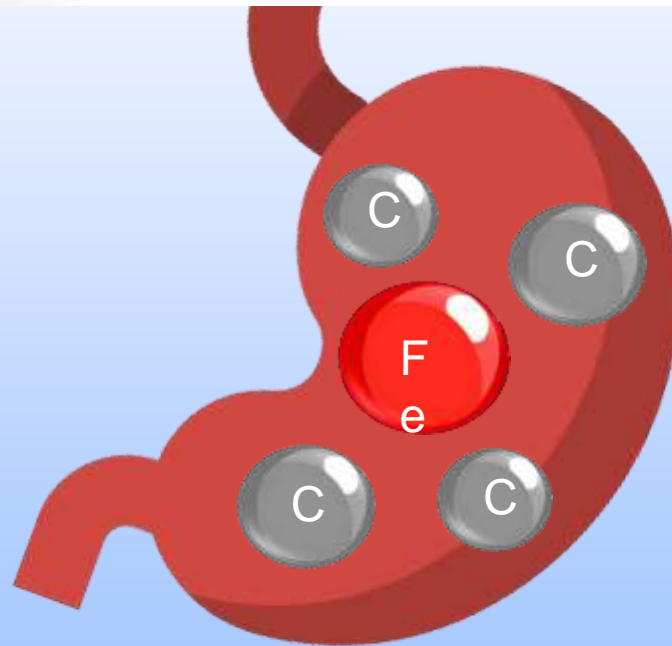
Pahami faktor yang dapat menghambat dan meningkatkan penyerapan zat besi di usus



Asupan zat besi



Asupan Vitamin C



Peningkatan penyerapan Zat Besi ke dalam tubuh

Formula isolat protein soya yang difortifikasi Vitamin C dan Zat Besi (IronC) serta nutrisi penting lainnya dapat mendukung tumbuh kembang optimal anak dengan

Mei Neni, MKS
ASS

Tatalaksana alergi susu sapi

- Nutrisi: **menghindari (*complete avoidance*)** segala bentuk produk susu sapi tetapi harus memberikan **nutrisi yang seimbang** dan sesuai untuk tumbuh kembang bayi/anak.
 - ASI eksklusif: ibu menghindari susu sapi/ produk
 - Formula susu terhidrolisat ekstensif
 - formula asam amino.
 - **isolat protein kedelai (krn kendala biaya/ rasa tidak bisa mengkonsumni AA, EHF), dengan edukasi kemungkinan cross-reaksi**
- BIAYA TINGGI

Mengenal Lebih Dekat Dengan Isolat Protein Soya

Protein merupakan nutrisi penting untuk mendukung pertumbuhan dan perkembangan anak

Kualitas Protein



Kualitas protein dinilai dari kelengkapan **kandungan asam aminonya**.¹




Kurangnya asupan asam amino esensial dapat mempengaruhi tumbuh kembang anak.¹

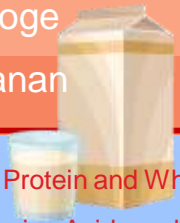


Terdapat 20 asam amino yang dibutuhkan manusia. Pada anak-anak, ada 11 asam amino non-esensial dan 9 asam amino esensial. Asam amino esensial perlu didapat dari makanan. ^{1,2}

Formula Isolat Protein Soya telah Difortifikasi Kelengkapannya nutrisinya untuk Tumbuh Kembang Anak

Pada formula isolat protein soya, beberapa asam amino esensial difortifikasi agar serupa dengan protein susu sapi, sehingga mendapatkan manfaat yang sama. Salah satu yang difortifikasi adalah *Methionine*, asam amino esensial untuk pertumbuhan dan perkembangan anak.

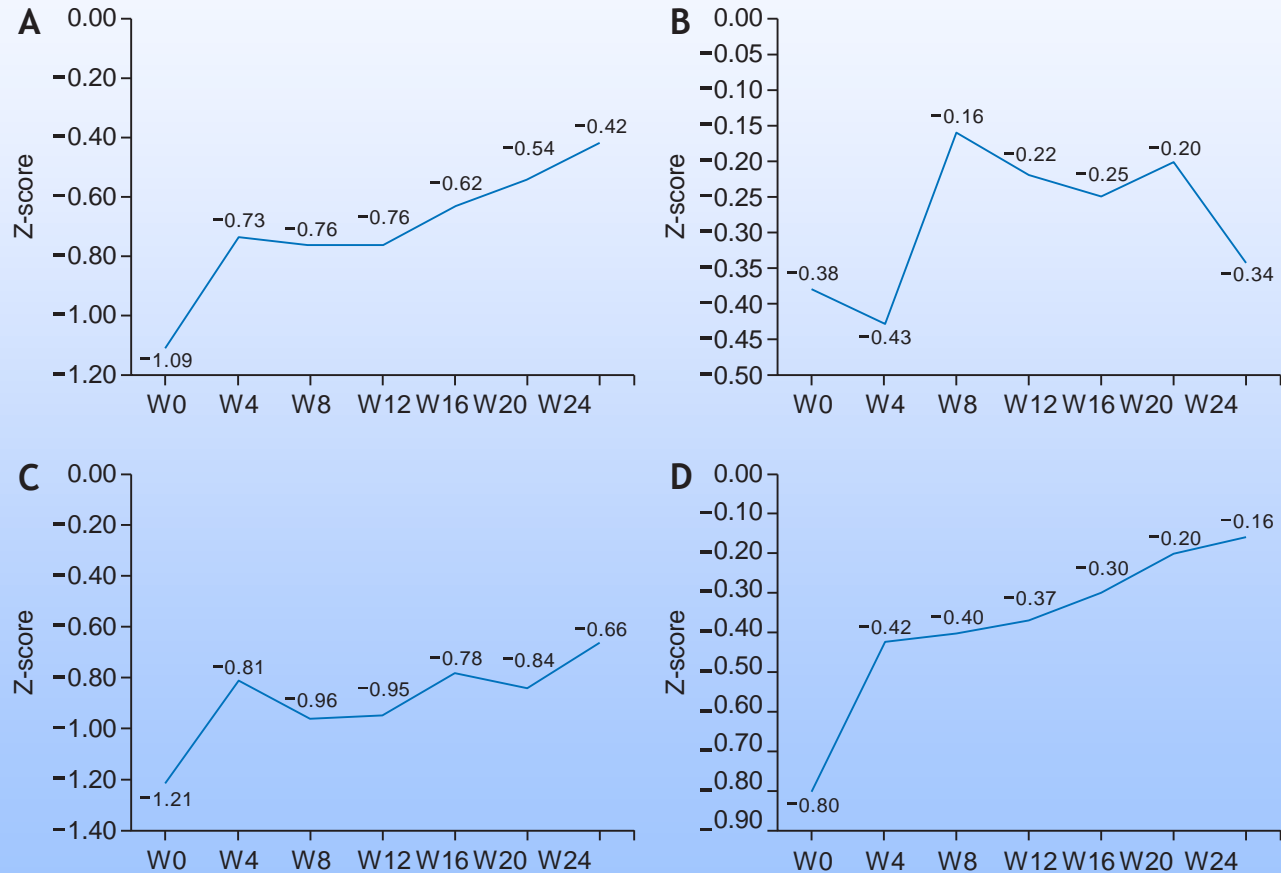
	Formula isolat protein soya	Susu Kedelai
Bahan Baku	Isolat protein soya	Biji kedelai 
Proses Pembuatan	Protein murni kedelai yang dilengkapi asam amino, seperti <i>metionin</i> , <i>tatine</i> dan <i>karnitin</i>	Kedelai yang di rendam atau tepung kedelai
Kandungan protein	26 g/ 28 g	7g/ 240 g
Kelengkapan Nutrisi	Difortifikasi asam amino esensial dan nutrisi yang sesuai dengan kebutuhan tumbuh kembang anak, seperti zat besi, zink, Calsium, vitamin C, omega 3, omega 6, dll	Tidak difortifikasi nutrisi untuk pertumbuhan dan perkembangan anak
Fita	Hampir sepenuhnya dihilangkan sehingga penyerapan zat besi dan zink lebih optimal	Kandungan fitat masih cukup tinggi
Fitoestrogen	Tidak berpengaruh pada efek hormonal	Kandungan fitoestrogen masih cukup tinggi
Keamanan	Aman dan direkomendasikan untuk anak	Tidak direkomendasikan untuk anak



Referensi: NIH. 2021 What Are Protein and What They Do. 2, Sarah D Cusi k, wt al 2016. The Role of nutrition in Brain Development and The Golden Opportunity of1 the first 1000 Days. J. Pediatr 175:10-21,3. Annisa Rizki, Ending Sujati. 2021. Low intake of Essential Amino Acids and Other Risk Factors of Stunting Among Under Five Children in Malang City. East Java. Indonesia. J Public Health research

Growth Patterns of Indonesian Infants with Cow's Milk Allergy and Fed with Soy-Based Infant Formula

Budi Setiabudiawan ¹, Mei Neni Sitaresmi ², Gartika Sapartini ¹, Sumadiono ², Endah Citraesmi ³, Rini Sekartini ⁴, Azwin Mengindra Putra ⁵, and Juandy Jo ⁶



Conclusion: These results show that infants fed with soy-based infant formula have a normal pattern of growth.

Fig. 1 Growth pattern of subjects. Panel A contains the Z-scores for weight-for-age. Panel B contains the Z-score for the length-for-age. Panel C contains the Z-score for the weight-for-length. Panel D contains the Z-score for the head circumference-for-age. W: week.

Developmental assessments during the first 5 years of life in infants fed breast milk, cow's milk formula, or soy formula

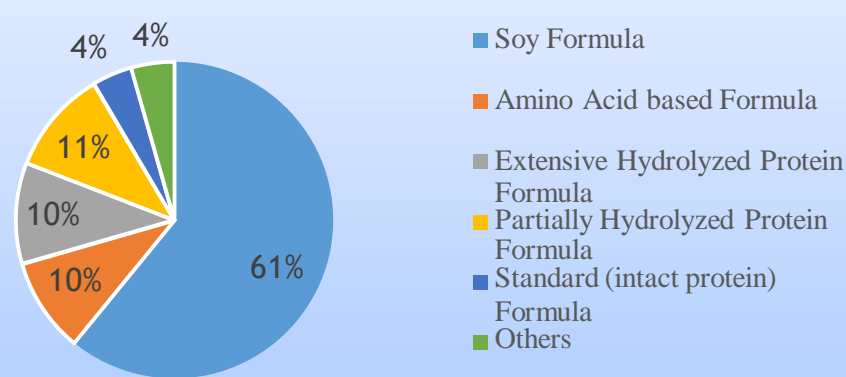
506 infants aged 1-2 months were followed until 60 months

BF children had significantly higher motor development scores at age 3 months than SF children (99.1 versus 97.2). BF children had significantly higher composite intelligence scores at 48 months than MF and SF children (113.4 versus 109.6 and 108.4, respectively) and higher verbal intelligence scores than SF children at 48 (105.6 versus 100.7) and 60 months (109.8 versus 105.9). Greater total language scores at ages 36 and 48 months were found in BF children compared with children fed MF or SF ($p < .001$), with differences between sexes for auditory comprehension. Higher total language scores at age 60 months were found between BF and SF (105.0 versus 100.1).

Conclusion: Breastfeeding was associated with small, statistically significant, differences between children ages 3 and 5 years in verbal intelligence, expressive communication, and auditory comprehension. Overall, MF and SF did not significantly differ.

Formula isolate protein soya

- Keuntungan: lebih ekonomis, mudah didapat/ tersedia, rasa lebih “enak- diterima (palatability), vegetarian
- paling banyak direkomendasikan oleh nakes¹



147 Spa, 68 perawat, 62 bidan

Figure 2. Nutritional products recommended by HCP for non-cow's milk drinkers

Formula isolate protein soya

- Pengaruh phyto- estrogens/ isoflavones → Terbukti tidak menimbulkan efek negatif terhadap fungsi reproduksi,, tiroid, termasuk sistem imun dan neurodevelopment/kognitif^{2,3}pubertas precox⁴
- Fiber mencegah konstipasi
- phytates sebagian besar sudah dihilangkan sehingga tidak mengganggu penyerapan mikronutrien termasuk besi dan zink, selain itu formula juga disuplementasi dengan Fe dan Zink

1. Basrowi RW, Wasito E, Sundjaya T. Perspective of Soy Formula and Fiber Intake among Non-Cow's Milk Drinker Pediatric Patients: A Survey among Indonesian Health Care Practitioner. *World Nutrition Journal* | eISSN 2580-7013 , 2020

2. Vandenas Y, Castellon PG, Rivas R, Gutiérrez CJ, Garcia LD, Jimenez JE, et al. Safety of soya-based infant formulas in children. *Br J Nutr* 2014;111:1340–60

3. Testa I, Salvatori C, Carli G, Di Latini A, Frati F, Troiani S, et al. Soy-Based Infant Formula: Are Still in Doubt. *Frontiers in nutrition* 2018 Nov;5:110.

4. [http://reub.elsevier.com/S0899-9007\(21\)00140-](http://reub.elsevier.com/S0899-9007(21)00140-4/sbref0043)

[4/sbref0043](http://reub.elsevier.com/S0899-9007(21)00140-4/sbref0043)

Kesimpulan

- Alergi susu sapi merupakan salah satu penyebab utama alergi makan, yang muncul **pada usia dini**, pada saat puncak pertumbuhan dan perkembangan otak, yang akan memberikan dampak pada pertumbuhan, perkembangan, perilaku dan kualitas hidup anak dan orang tua.
- Formula isolate susu soya merupakan alternatif tatalaksana nutrisi pada anak dengan alergi susu sapi:
 - keuntungan lebih ekonomis, mudah didapat, rasa lebih diterima oleh anak
 - Difortifikasi dengan asam amino esensial, mikronutrien dan fitat sebagian besar sudah dihilangkan
 - Pertumbuhan dan perkembangan serupa dengan formula susu sapi
 - Aman, tidak terbukti mengganggu fungsi tiroid, pubertas dan fungsi reproduksi

Terima kasih